SC6000

Reference Manual

DATALOGIC

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DATALOGIC S.p.A.
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SC6000 Reference Manual

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REFERENCES

REFERENCE DOCUMENTATION

The documentation related to the SC6000 is listed below:

- PWO power supply unit
- Document about the Ethernet connectivity
- Document about the Profibus connectivity
- Guide to Installing a Redundant System
- Replacing an SC8000 Controller
- Help On-Line in PDF format

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SAFETY REGULATIONS

POWER SUPPLY

- **This product is intended to be installed by Qualified Personnel only.**

WEEE COMPLIANCE

GENERAL VIEW

SC6000 Controller

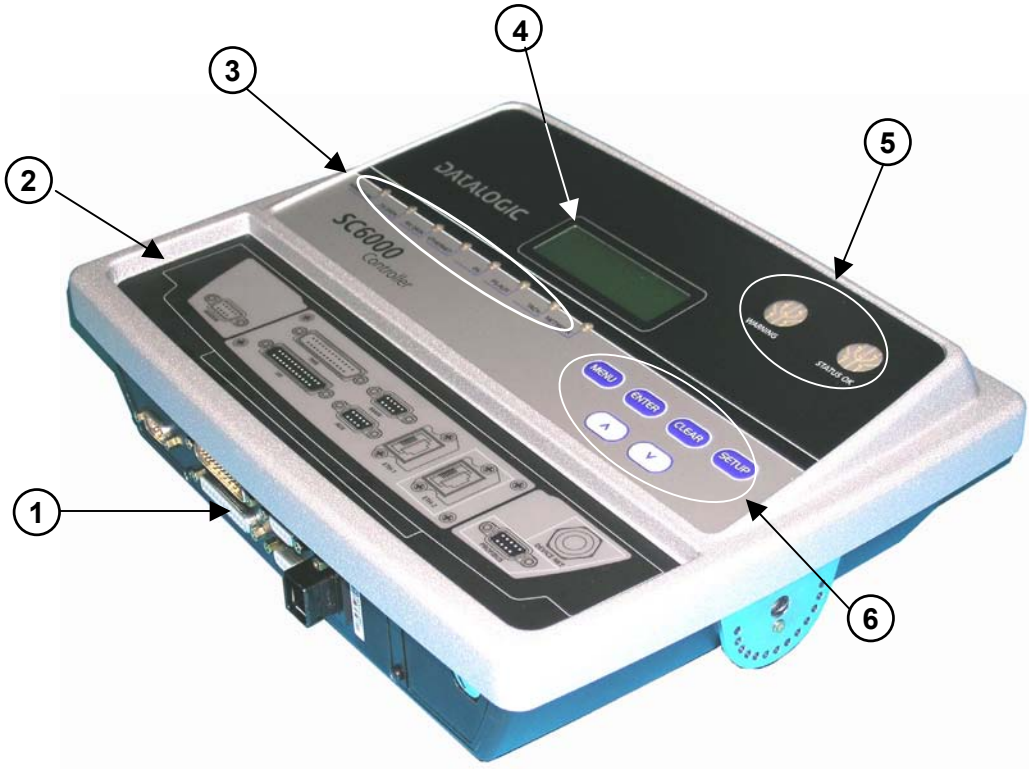


Figure 1 - General View

1. Connector Panel
2. Connector Panel Legend
3. Power On and Communication LEDs
4. LCD Display
5. Status LEDs
6. Programming Keypad

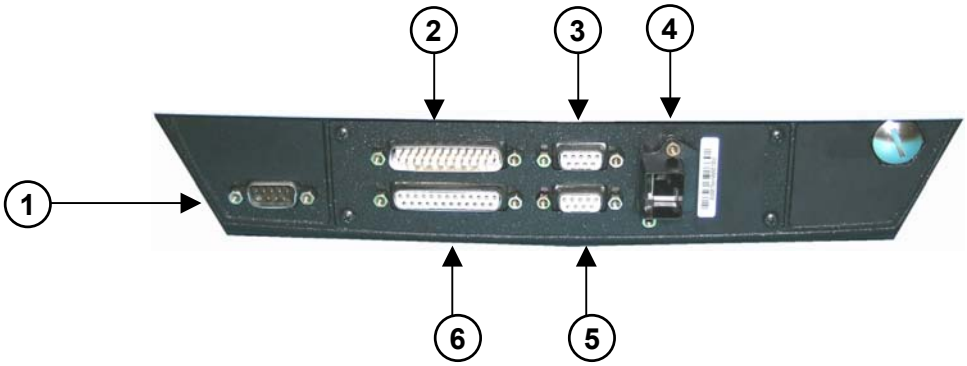


Figure 2 - SC6000-1200 Standard Model Connector Panel

(1) Modem Connector	(4) Ethernet Connector
(2) Power/Net Connector	(5) Auxiliary Interface Connector
(3) Main Interface Connector	(6) Extended I/O Connector

Figure 3 - SC6000-1211 Profibus Model Connector Panel

(1) Profibus Connector

Figure 4 - SC6000-1215 DeviceNet Model Connector Panel

(1) DeviceNet Connector

Figure 5 - SC6000-1230 Dual Ethernet Model Connector Panel

(1) Ethernet Connector

GUIDE TO INSTALLATION

The following can be used as a checklist to verify all the steps necessary to complete installation of the SC6000 Controller.

1) Read all information in the section “Safety Precautions” at the beginning of this manual.

2) Correctly mount the SC6000 using the bracket provided according to the information in par. 2.3.

3) Connect the SC6000 Controller to the PWO by means of the appropriate accessory cables (see par. 1.4).

4) Provide correct and complete system cabling through the PWO according to the signals (Lonworks, encoder P.S., etc) necessary for the layout of your application. (See subparagraphs under par. 2.4 and 2.5. See also the PWO Installation Manual).

5) Install the Genius™ configuration program onto a laptop PC from the CD-ROM provided. Configure the SC6000 Controller by connecting this PC to the SC6000 Auxiliary port.

   For configuration of a cluster of DS6000 family scanners, or DS8100A/DX8200A scanners or both, see par. 3.2.

   For configuration of a cluster of DS8100 or DX8200 scanners or both, see par. 3.3.

6) Execute the Backup procedure described in par. 4.1.

7) Exit the configuration program and run your application.

The installation is now complete.

1 INTRODUCTION

1.1 PRODUCT DESCRIPTION

The new SC6000 Controller offers all the necessary functions to make the phases of installation, setup, testing, and maintenance of the omni-directional reading tunnel easy and quick.

The SC6000 Controller key functions are:

- Bus Controller: cluster management and Host interface of a multisided reading tunnel based on Lonworks bus;
- DARP™ (Datalogic Automatic Replacement Procedure) function: automatic procedure for scanner and bus controller replacement;
- Diagnostic indications on the reading station status, simple to be detected without any PC needed. This indications, based on LEDs and display, offer to the maintenance staff all the necessary information;
- Easy remotization of all the reading station information, thanks to built-in Ethernet and field bus connectivity, and a dedicated 9-pin connector for Modem connection.

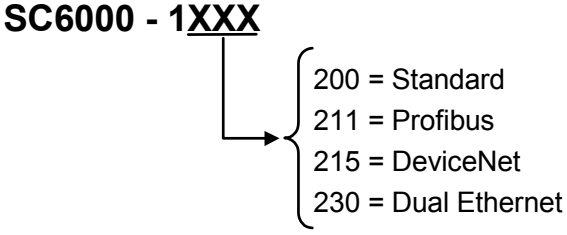
The SC6000 Controller is based on a robust alloy case divided into two parts: on the upper part there is the display, the keypad and the LEDs. The lower part contains the motherboard, the removable Compact-Flash memory, the fieldbus boards and the connector panel.
The simple and sturdy mechanical structure makes the SC6000 Controller the ideal solution for industrial environments.

The SC6000 Controller is fully compatible both with the 6000 family and with the 8000 family (DS8100A and DX8200A) scanners. This means that the SC6000 Controller can work as a bus controller for a cluster of DS6000 family scanners, or DS8100A/DX8200A scanners or both.

The SC6000 Controller is also compatible with DS8100 and DX8200 (Lonworks versions). It is not possible to mix DS8100/DX8200 with 6000 family or DS8100A/DX8200A.

1.2 MODEL DESCRIPTION

The SC6000 Controller is available in versions that differ in regard to the following characteristics:



1.3 LED INDICATORS

Figure 6 - LEDs Description

(1) Power ON and Communication LEDs (2) Status LEDs

System Signal LEDs

Name	Color	State	Function
Power ON	Green	ON OFF	SC6000 Powered No Power
Tx Data	Green	Blinking OFF	Transmitting Data on MAIN No Data Transmission
Rx Data	Green	Blinking OFF	Receiving Data on MAIN No Data Reception
Ethernet	Red	ON OFF	Ethernet Line Connected No Ethernet Line Connected
PS	Yellow	ON OFF	Presence Sensor Active Presence Sensor Not Active
PS Aux	Yellow	ON OFF	Presence Sensor Active Presence Sensor Not Active
Tach	Yellow	Blinking OFF	Encoder Active Encoder Not Active
Network	Red	ON OFF	Lonworks OK Lonworks Error

System Event Status LEDs

Name	Color	State	Function
Warning	Red	ON OFF	Scanner Cluster Failure Scanner Cluster OK
Status OK	Green	ON OFF	Controller Status OK Controller Failure

1.4 ACCESSORIES

The following accessories are necessary to build a reading station based on SC6000 (the scanner-related accessories are not included):

Name	Description	Part Number
CAB-SC6003	25p cable SC6000 to PWO, 3 m (for Power/Net & Extended I/O connections)	93A051293
CAB-SC6103	9p cable SC6000 to PWO, 3 m (for Main and Modem connections)	93A051294
CAB-PWO 03	17p cable PWO to PWO, 3 m (for redundancy)	93A051295
PWO-480	Power&Connect system, 480W	93ACC1767

2 INSTALLATION

To install the system follow the given procedure:

1) Select the mounting location and mount the SC6000 Controller;
2) Mount the PWO (refer to the PWO Installation Manual);
3) Proceed with system electrical connections;
4) Install the GENIUS™ program on the configuration PC.

NOTE

If your system requires the SC6000 to be connected to PWO refer to the Reference Documentation section for details.

2.1 PACKAGE CONTENTS

Verify that the SC6000 Controller and all the parts supplied with the equipment are present and intact when opening the packaging; the list of parts includes:

- SC6000 Controller
- Installation Quick Reference
- SC6000 Configuration CD-ROM
- Mounting brackets with knobs and washers

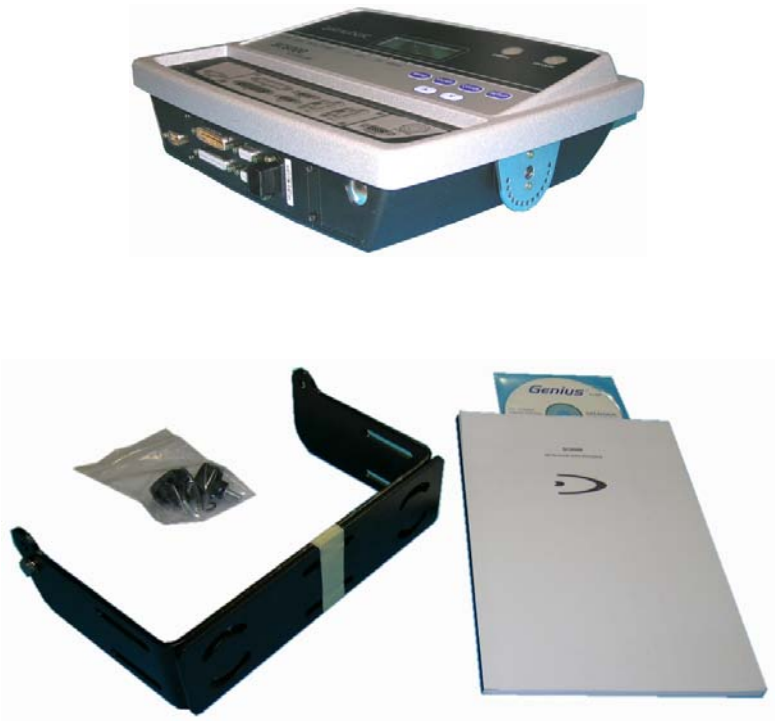


Figure 7 - SC6000 Package Contents

2.2 OVERALL DIMENSIONS

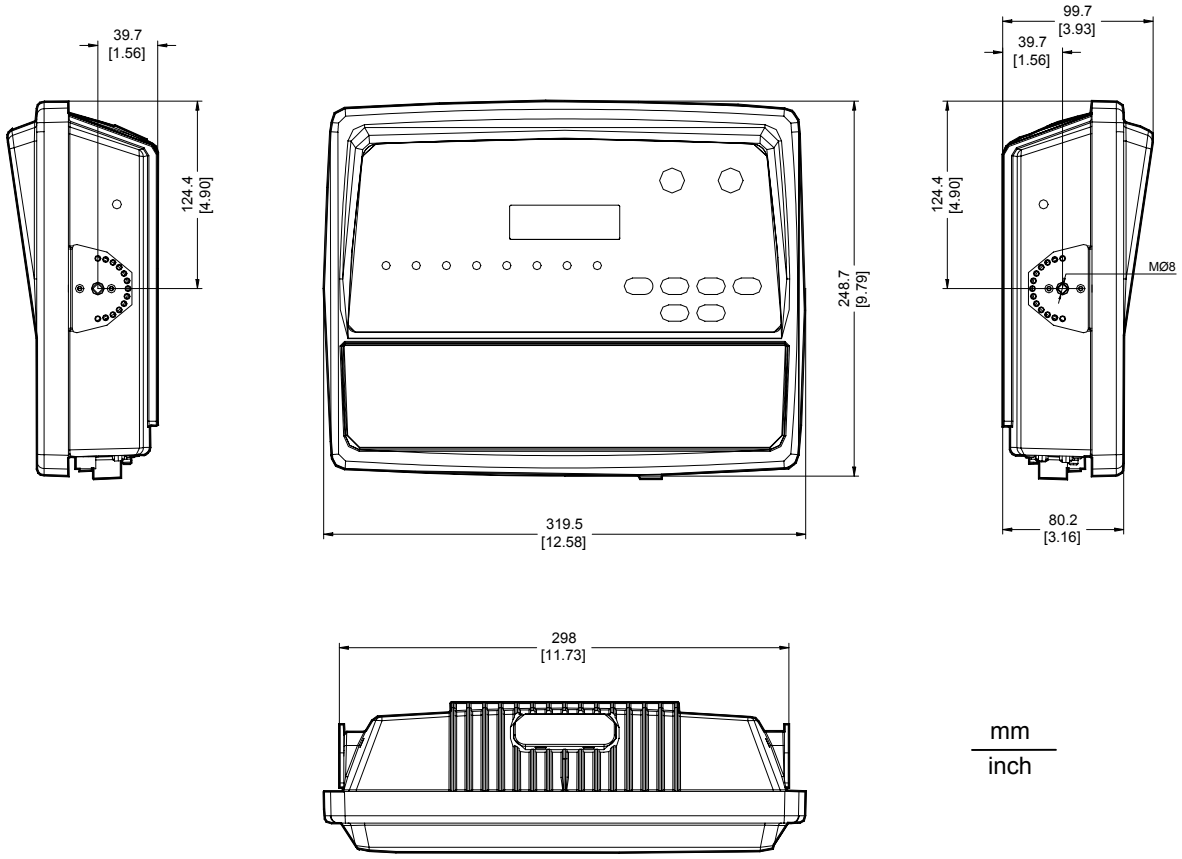


Figure 8 - SC6000 Overall Dimensions

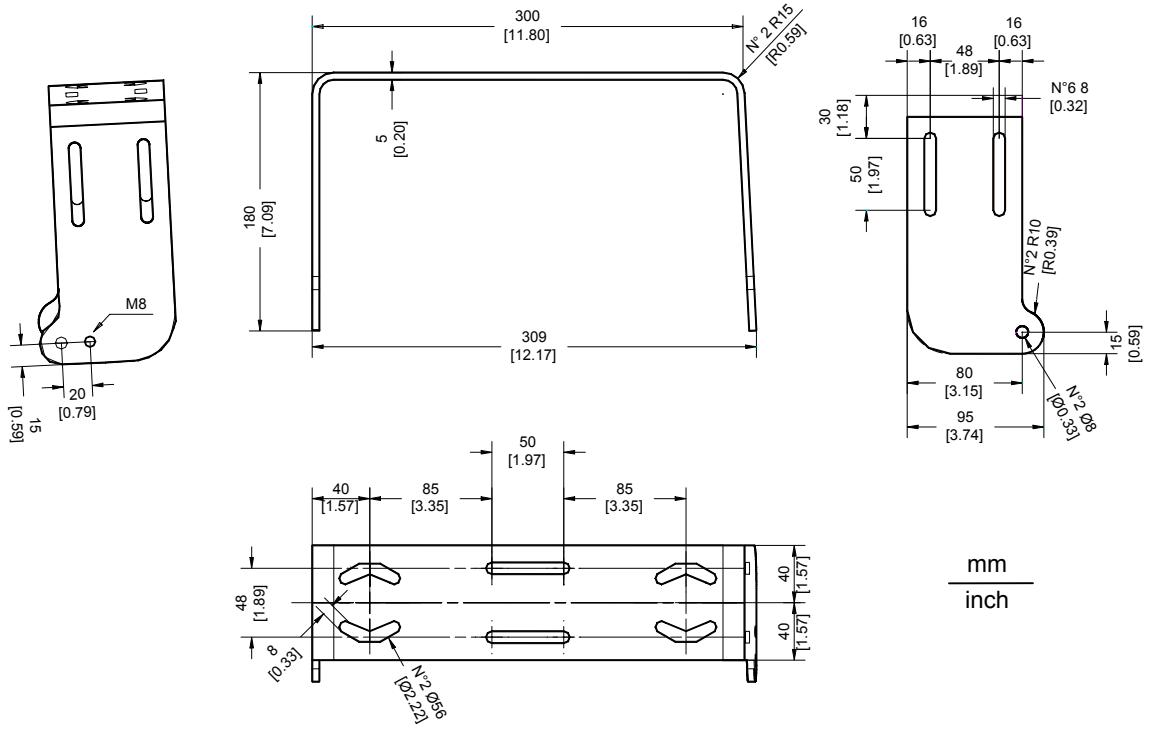


Figure 9 - ST-222 Bracket Overall Dimensions

2.3 MECHANICAL MOUNTING

To mount the SC6000 Controller on the reading station frame proceed as follows:

1 Mount the bracket on the reading station frame: the slots on the bracket will help obtain the best positioning. When working in environments characterized by strong vibrations, set the screws as close as possible to the bracket edges, see Figure 10.

2 Tighten the ST-222 bracket to the reading station frame using the screws and washers.

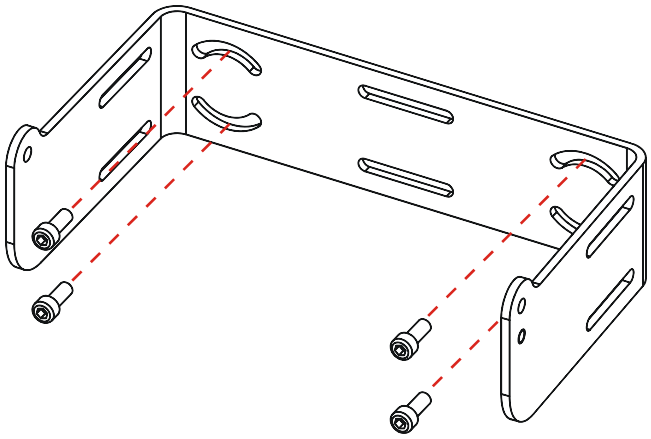


Figure 10 - Mounting the bracket on the reading station frame

3 Position the SC6000 Controller at the top of the bracket: make sure the two large round openings coincide to the ones located at the edges of the SC6000 Controller.

4 While supporting the SC6000 Controller, rotate the whole device until it is aligned for the best viewing position, then insert the set pin screw with locking washer until it inserts into one of the small positioning holes located on the terminal bracket.

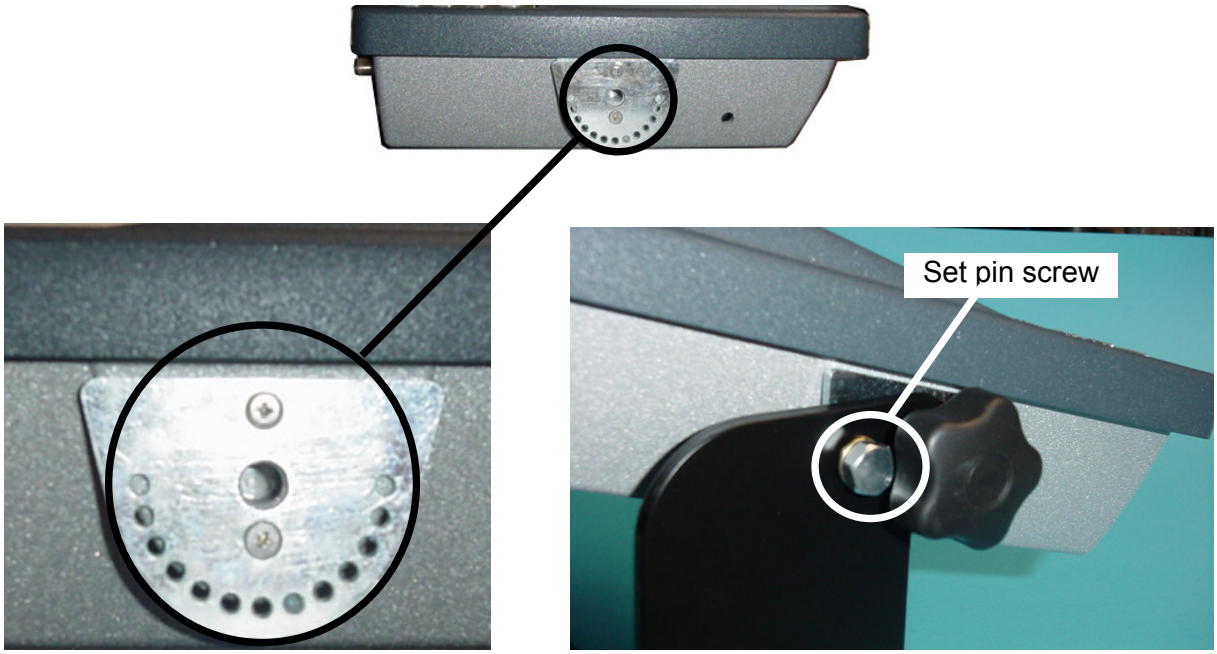


Figure 11 - SC6000 Controller Side View with Punched Steel Ring and Relative Set Pin Screw

The specially punched steel ring has been designed to obtain the most precise rotation possible in terms of angle calibration, steadiness and consequent absence of torque between both sides of device.

5 Place a locking washer and then a flat washer onto each knob. Tighten the SC6000 Controller to its bracket by screwing the knobs into their holes - one on each side.

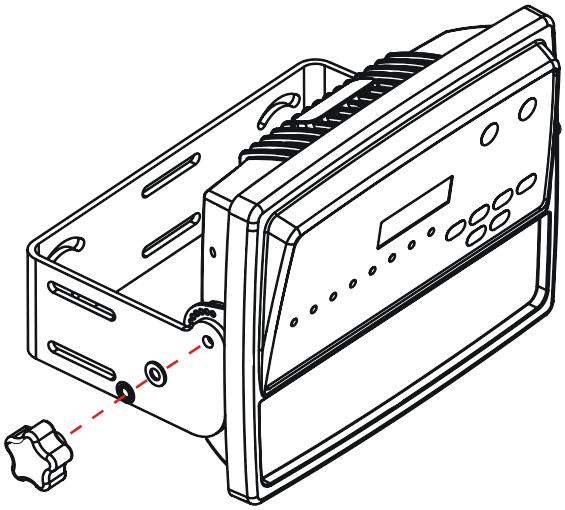


Figure 12 - Mounting the SC6000 Controller on the bracket

The SC6000 Controller can rotate on its mounting bracket up to 90° with respect to the mounting bracket position. See figure below for suggested positions:

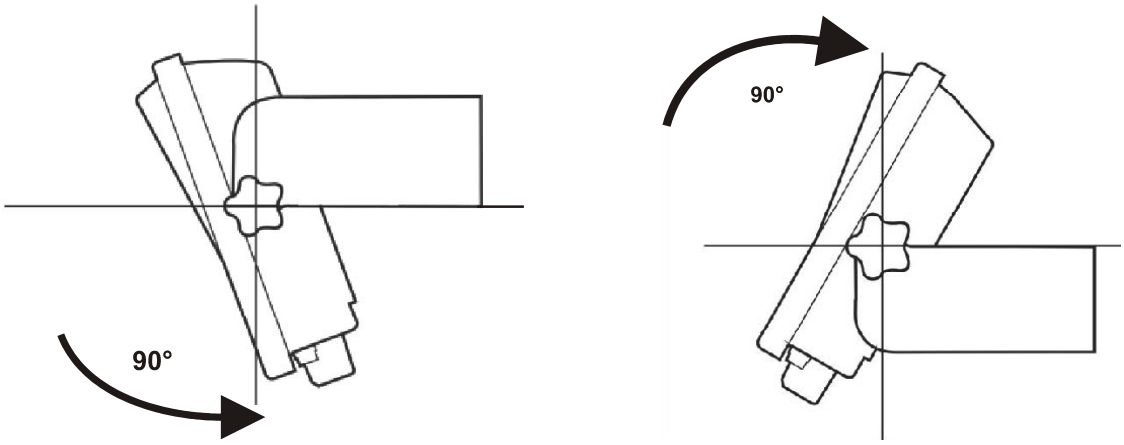


Figure 13 - Suggested Mounting Positions

2.4 ELECTRICAL CONNECTIONS

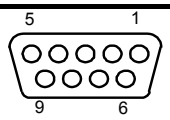
The connectors available for each scanner model are the following:

Scanner Model	Connector	Type
All models	Power/Net	25-pin male power supply, lonworks and input/output signals
	Extended I/O	25-pin female extended I/O signals (optoisolated)
	Modem	9-pin male modem connection
	Main	9-pin female RS232/RS485 main serial connection
	Aux	9-pin female RS232 auxiliary connection
	Eth-1	RJ45 modular Ethernet network
- **1230**	Eth-2	RJ45 modular Ethernet network
- **1211**	Profibus	9-pin female Profibus network
- **1215**	DeviceNet	5-pin male DeviceNet network

2.4.1 Auxiliary Interface

The auxiliary serial interface is equipped with RS232 interface connections. The interface can be enabled or disabled through the Genius™ configuration program.

The following pins of the 9-pin connector are used for RS232 interface connection:

9-pin D-sub Female Connector Pinout			
Pin	**Name**	**Function**	
2	TX	Transmit	
3	RX	Receive	
5	GND	Ground	**9-pin D-sub Female Connector**

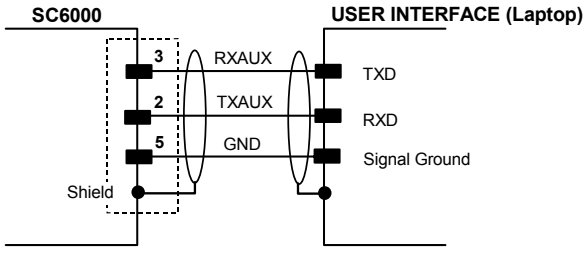


Figure 14 - RS232 Auxiliary Interface Connections

2.4.2 Ethernet Connector

This connector is available for all SC6000 Controller models and allows the Ethernet connection to the host.

In the SC6000-1230 Dual Ethernet there are two Ethernet connectors for secondary host connections.

RJ45 Modular Jack Pinout		
Pin	**Name**	**Function**
1	TX +	Transmitted data (+)
2	TX -	Transmitted data (-)
3	RX +	Received data (+)
6	RX -	Received data (-)
4, 5, 7, 8	N.C.	Not connected

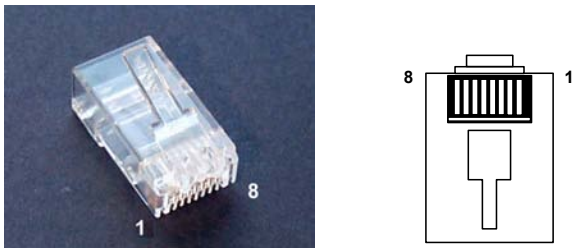


Figure 15 – Cable RJ45 Male Modular Connector

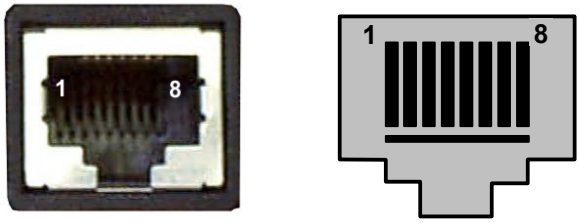


Figure 16 – RJ45 Female Modular Connector

This interface and the connector pinout (see the following table) are IEEE 802.3 10 BaseT and IEEE 802.3u 100 BaseTx compliant.

Ethernet Interface

The Ethernet interface (NIC) can be used for TCP/IP communication with a remote or local host computer by connecting the SC6000 Controller to a LAN or directly to a host PC.

The following is an example of a connection to a LAN through a Hub using a straight through cable:

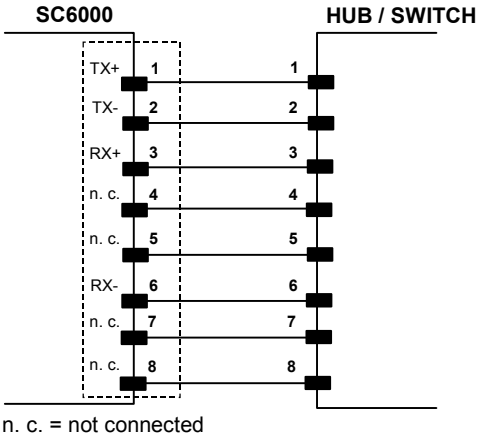


Figure 17 – Straight Through Cable

The following is an example of direct connection to a PC using an inverted cable:

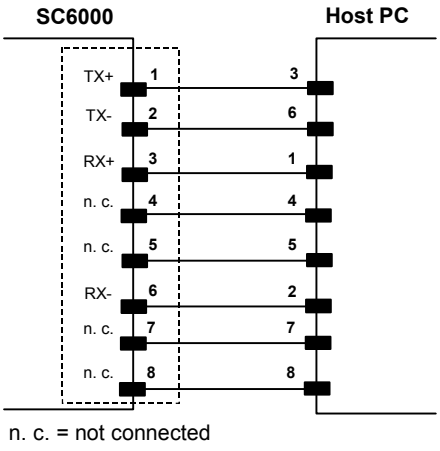


Figure 18 – Inverted Cable

2.4.3 DeviceNet Connector

The 5-pin male connector is only available in the SC6000-1215 DeviceNet model and allows connection between the host and the controller:

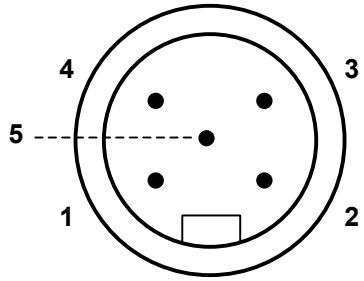


Figure 19 - DeviceNet 5-pin Male Connector

5-pin DeviceNet connector pinout		
Pin	**Name**	**Function**
2	V +	Supply voltage – positive pin
5	CAN_L	CAN bus data line – L
1	SHIELD	Shield
4	CAN_H	CAN bus data line – H
3	V -	Supply voltage – negative pin

NOTE

The power supplied on pin V+ and V- is used only to propagate power to the section of the DeviceNet board directly connected to the Bus. It is completely isolated from the SC6000 power, which must be supplied on pin 16 and pin 3, 4 of the 25-pin Power/Net connector.

2.4.4 Profibus Connector

The 9-pin female Profibus connector (white) is only available in the SC6000-1211 Profibus model and allows connection between the host and the controller:

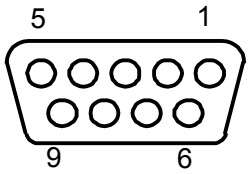


Figure 20 - Profibus 9-pin Female Connector

9-pin D-sub Female Profibus connector pinout		
Pin	**Name**	**Function**
1	Shield*	Shield, protective ground resp.
2	N.C.	Not connected
3	B-LINE (RxD/TxD-P)	Received/Transmitted data-P
4	CNTR-P**	Repeater control signal
5	DGND	Data ground (M5V)
6	+5 V	Voltage plus (P5V)
7	N.C.	Not connected
8	A-LINE (RxD/TxD-N)	Received/Transmitted data
9	CNTR-N**	Repeater control signal

* signal is optional

** signal is optional; RS485 level

Profibus Interface

The Profibus interface is used for communication with a Host and allows expanding the networking and remote diagnostic capabilities of the controller.

For further details refer to the “Profibus_Fam6k.pdf” document provided as supplementary documentation.

2.5 TYPICAL LAYOUTS

The following typical layouts refer to system hardware configurations, but also require the correct setup of the software configuration parameters (see par. 3.2 for details).
Other layouts require the use of a specific SC6000 Controller model.
The accessories and cables indicated in the following figures are Datalogic products. We suggest their use to guarantee the correct system functioning.

2.5.1 Standard Layout

For Standard layouts the following connections can be made:

- Ethernet direct or through Hub;
- point-to-point on the Main interface using either RS232 or RS485 full-duplex communications to Host;
- directly to a modem for remote Host communications.

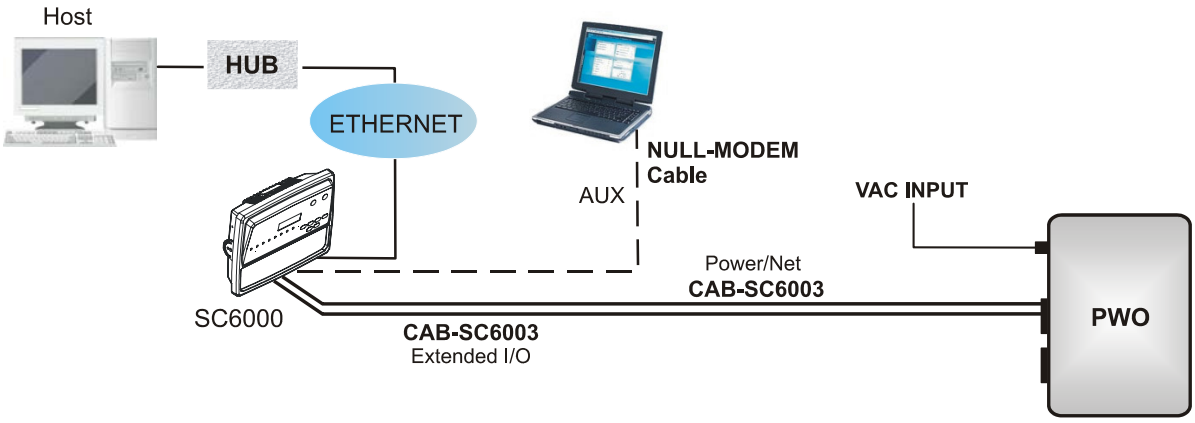


Figure 21 - Ethernet Connection

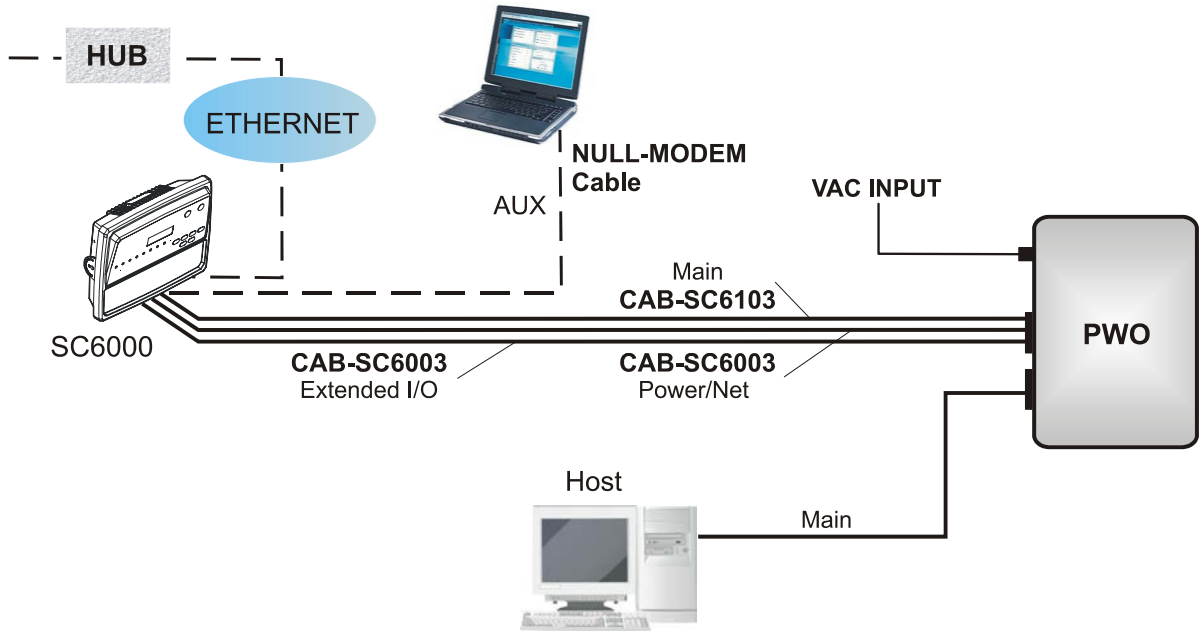


Figure 22 - Main Connection

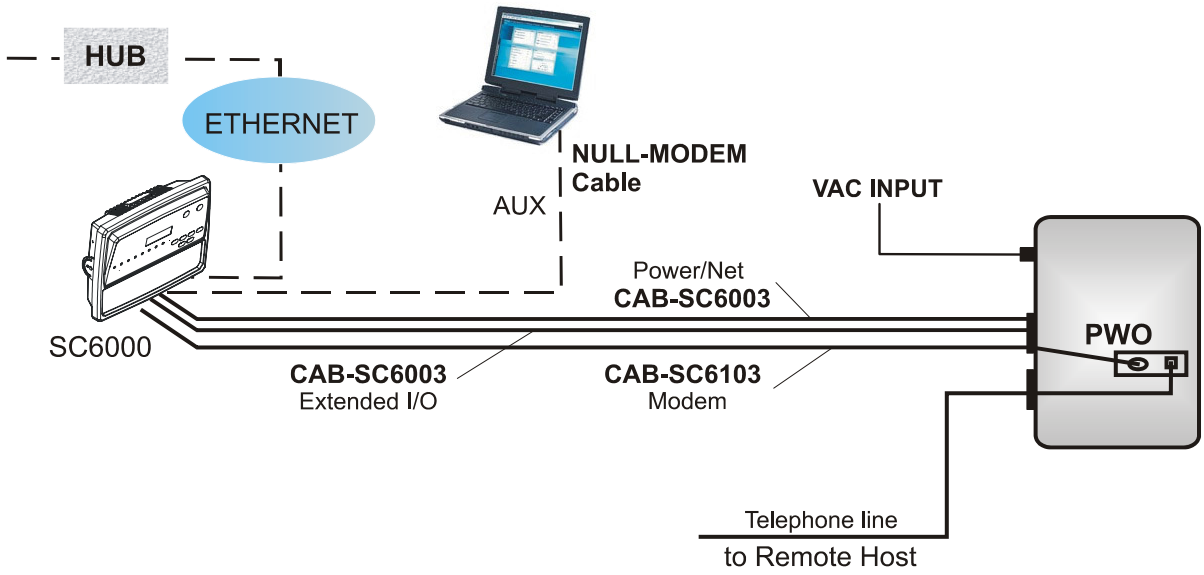


Figure 23 - Modem Connection

2.5.2 Fieldbus Network

The SC6000 can be connected to a Fieldbus network (Ethernet, Profibus and DeviceNet) to communicate with a remote host (for example, remote PC connected via Internet). Connections are made directly through cables to the Fieldbus connector and do not require any converter or adapter.

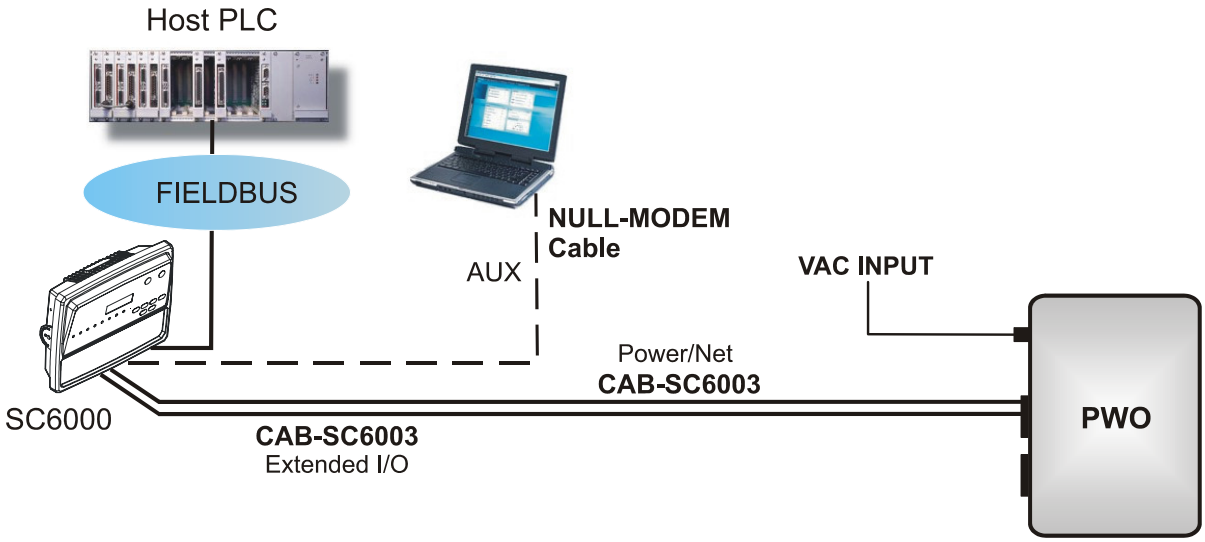


Figure 24 - Fieldbus Network

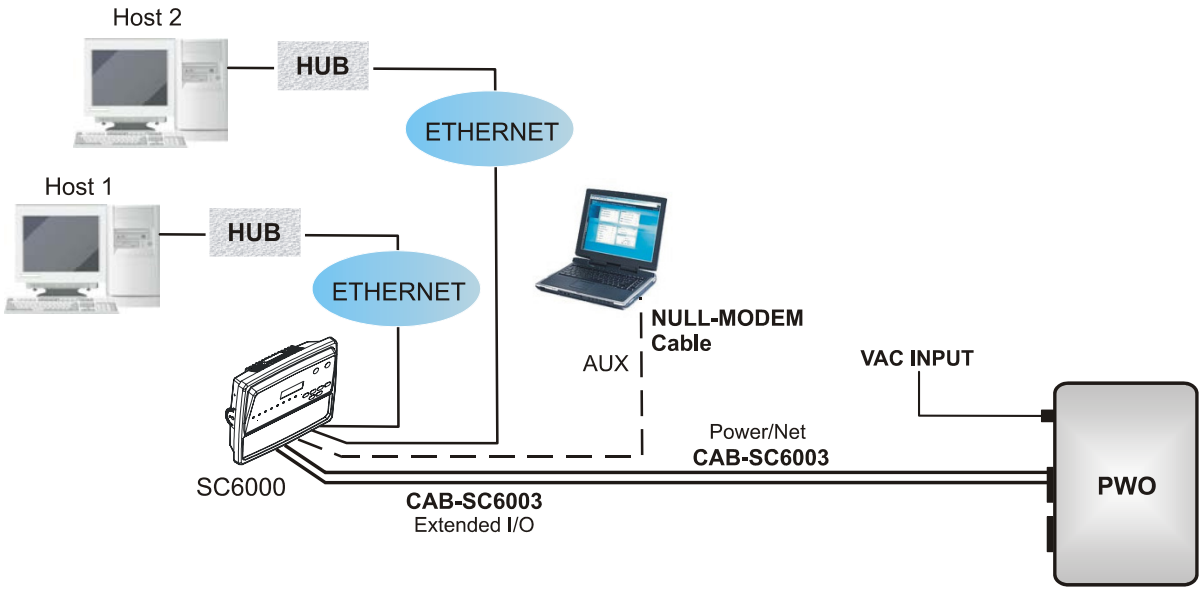


Figure 25 - Dual Ethernet Connection

2.6 KEYPAD AND DISPLAY

The SC6000 keypad allows entering a menu to select one of the functions described in the following paragraphs.

2.6.1 Standard Mode

Upon startup, the diagnostic mask window is visualized by default. Using the UP and DOWN keys it is possible to scroll the other windows following this order:

1) Diagnostic Mask Window
2) Performance Window
3) Reading Mask Window
4) I/O Status Window
5) System Info Window

Diagnostic Mask Window (Default Window)

This window illustrates the status of each node (of each scanner of the cluster) according to the following convention:

" - " From the startup the node NID has not been discovered.
" ? " At the startup of the system the NID has been discovered but the node does not answer to the master.
" * " The node status is OK.
" ! " The node returns an error code to the diagnostic Laser Off.
" & " The node returns an error code to the diagnostic Motor Off.
" % " The node is in monitor mode.

Reading Performance Window

This window displays the following data:

- Number of the processed parcels
- Good Read Rate
- No Read Rate
- Multiple Read Rate

Reading Mask Window

This window indicates the node that performed a reading of the codes enabled on the master.

The following indicators are used:

" * " The node read a barcode enabled on the master.
" - " The node read no barcode.

I/O Status Window

This window provides data concerning the conveyor speed and the digital input/output status.

System Info Window

This window provides information about the software release.

2.6.2 Menu Mode

For security purposes, the menu mode is entered by pressing the ENTER and MENU keys at the same time.

Through this menu, it is possible to perform the following:

- Main Parameter Setting: IP address, Netmask, Gateway address; Profibus address (for Profibus models); DeviceNet address (for DeviceNet models); supplementary IP address, supplementary Netmask, and supplementary Gateway address (for Dual Ethernet models).

  These parameters may be set through the Genius™ program (see chapter 3 for details).

- Date&Time setting;

- DARP™ (Datalogic Automatic Replacement Procedure);

- CASP™ (Cluster AutoSetup Procedure): this procedure allows automatic address assignment to the scanner cluster nodes. This operation can also be performed by starting up the system while pressing the SETUP key.

3 SOFTWARE CONFIGURATION

3.1 GENIUS™ INSTALLATION

Genius™ is a new Datalogic scanner configuration tool providing several important advantages:

- Multi-language version;
- Defined configuration directly stored in the device;
- Communication protocol independent from the physical interface allowing to consider the device as a remote object to be configured and monitored.

To install Genius™, proceed as follows:

1) Turn on the PC that will be used for configuration (Windows 95/98 or NT);
2) Insert the Genius™ CD-ROM;
3) Wait for the CD to autorun and follow the installation procedure.

When running Genius™, the procedure for setting the parameters is supported by a help on-line, which is displayed in an HTML browser. It can be selected from the Configuration Help option available in the Help menu. In addition, a context-sensitive help can be enabled by pressing the <F1> key after selecting the desired parameter.

3.2 GUIDE TO RAPID CONFIGURATION FOR DS6000, DS8100A AND DX8200A SLAVE SCANNERS

1. Run Genius™ from the configuration PC. The following window appears asking to select the configuration mode.

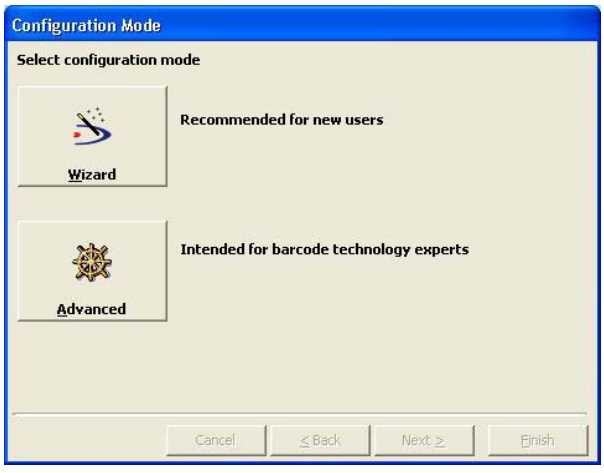


Figure 26 - Genius™ Wizard Opening Window

Select Advanced. The Wizard option is not currently available for SC6000.

2. From the Device Menu select Local Device Network Settings and configure your SC6000 as Master (SYNCHRONIZED is the default value), as shown in the figure below:

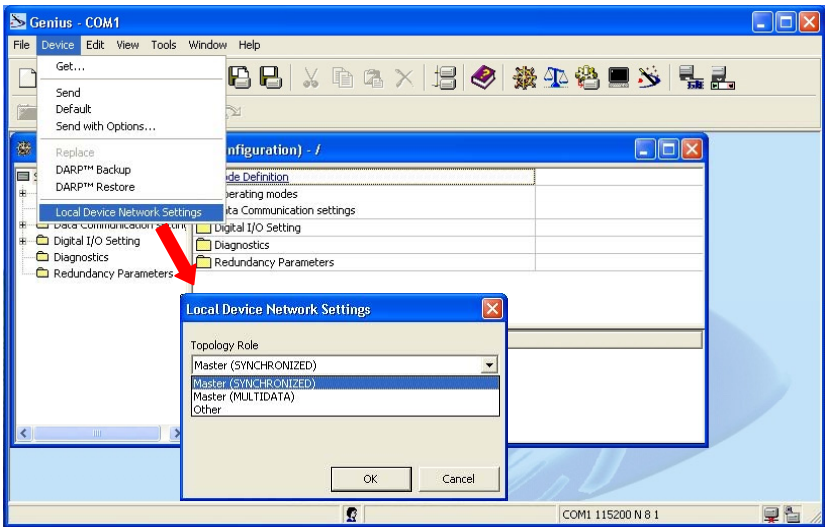


Figure 27 – Local Device Network Settings

The following dialog box appears asking whether to send the configuration to the Master or not:

3. Click the "Yes" button, then click on the icon available on the Toolbar to make the “Devices” area appear next to the Parameter Explorer window. By repeatedly clicking the icon this area will be displayed or hidden.

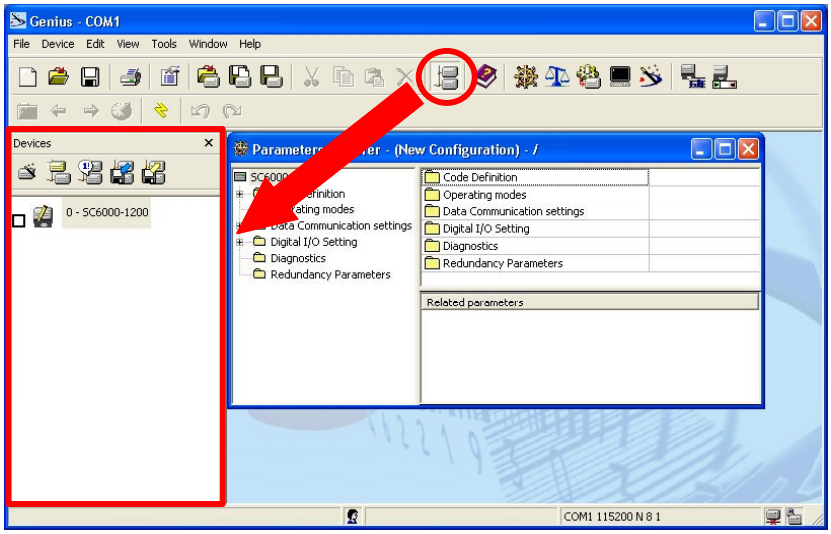


Figure 28 – View Device Configuration

Each device is indicated by the following graphical objects:

- check box allowing to select/deselect a specific device to perform the desired operations (i.e. program downloading);
- icon representing the device status;
- a label reporting information transmitted by the device when connected (the device address, generated errors, device description).

4. Then, proceed with the Network Setup (par. 3.2.1).

5. Configure the SC6000 and Slave Scanner parameters according to your application using the configuration window in Genius™ for each device. The main steps are:

- Configure the PackTrack parameters
- Select the codes to be read
- Set-up the communication parameters
- Define data formatting parameters

6. Send the configuration to the Slave Scanners from the Send command in the Device Menu.

7. Perform a DARP™ backup by clicking the relative icon in the Device Network area.

3.2.1 Genius™ Network Setup Through Master

Network Setup allows configuring your Local Lonworks Network through the Master using Genius™.

Three different procedures are available to define the number of network slave scanners, their label and address according to two main conditions:

Condition	Available Procedure	Feature
Unknown Slave Addresses	Net-Autoset	automatically assigns random addresses to slave or Stand Alone scanners.
Known Slave Addresses	Network Wizard	customizes the network (slave label and address definition and physical identification of a specific slave within network), updates configuration to a file and makes it ready to be sent to the Master.
	Express Network Setup	automatically performs all the operations of the Network Wizard apart from the physical identification of a specific slave scanner.

NOTE

The Network Setup procedure as described requires Genius™ software version 1.06 or later. In addition, the Net-Autoset procedure requires scanner software version 6.40 or later.

Proceed with the network setup by using one of the icons available on the Tool Bar according to the procedure to follow:

= Net-Autoset procedure

= Network Wizard procedure

= Express Network Setup procedure

Net-Autoset

This procedure is to be used when all scanner addresses and labels are unknown (typically when configuring the network for the first time or whenever a network reconfiguration is required).

By clicking the icon or selecting the "Net_Autoset" option from the right-click menu, the Net-Autoset procedure is started allowing automatic assignment of random addresses to all slave or Stand Alone scanners connected within the network.
Once the procedure has been completed, it is possible to:

- define customized addresses and labels through the Network Wizard;
- display the scanner default labels through the Express Network Setup.

Express Network Setup

Before performing this procedure, a Lonworks address must be assigned to each slave scanner. The most practical method is through the Net-Autoset procedure. See par. 3.2.2 for alternative address assignment methods.

Once all addresses have been assigned, the Express Network Setup is to be used when all scanner addresses and labels do not need to be modified.

By clicking on the icon or by choosing the related option from the right-click menu, the procedure is started which automatically performs the following operations:

- opening the wizard;
- polling the network to discover connected scanners;
- transferring all scanners found to the "Requested Devices" area of the wizard where your network customization is defined;
- saving the new network configuration;

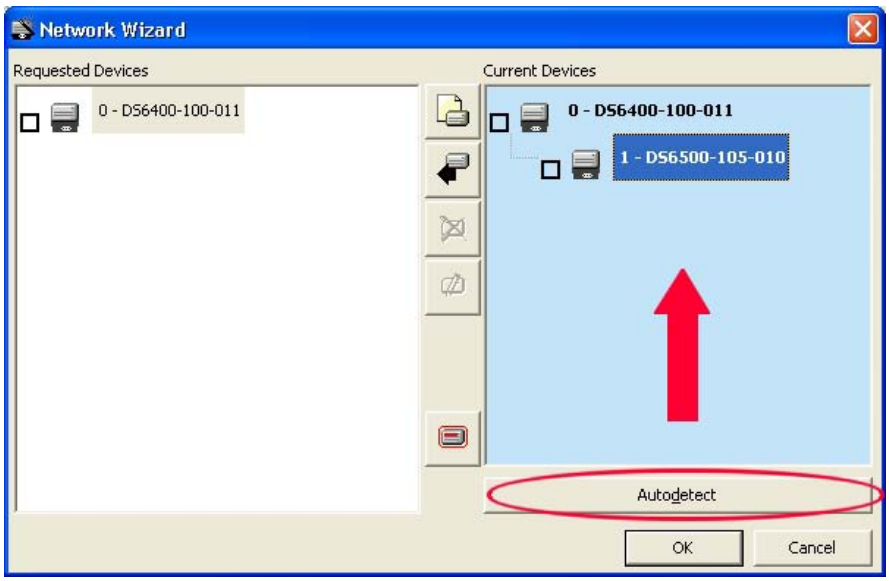
Once the procedure has been completed, a dialog box will appear asking whether to send the configuration to the Master. Choose the “Yes” option to start this procedure.

Network Wizard

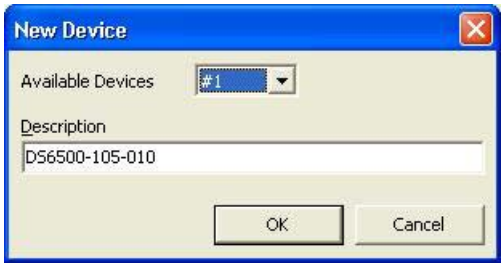
Before performing this procedure, a Lonworks address must be assigned to each slave scanner. The most practical method is through the Net-Autoset procedure. See par. 3.2.2 for alternative address assignment methods.

Once all addresses have been assigned, the Network Wizard is to be used when one or more scanner addresses and labels need to be modified.

1. Click on the button to open the Network Wizard dialog box:

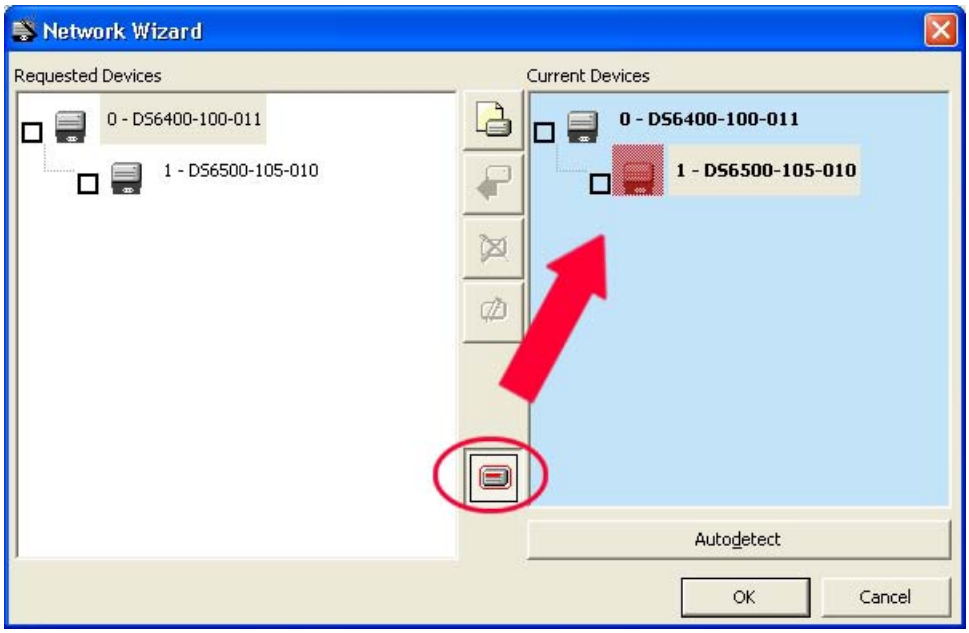


a. if the slave scanners have already been configured and wired to the network, click on the Autodetect button to start a polling procedure of the current network. All slave scanners found will be represented in the “Current Devices” area. Then, select the desired slave scanner from the “Current Devices” area and click on the icon (or drag and drop) to transfer it to the “Requested Devices” area where your network customization is defined. The following dialog box will appear allowing (if necessary) to change the slave address ("Available Device" field) and label ("Description" field):



b. if the slave scanners have not been configured and wired to the network, click on the icon to add a new device defining its address and model. The added slave scanner will be displayed in the “Requested Devices” area. This option in any case requires that all slave scanners have their address set before the network can function.

2. If desired, select a slave scanner within the "Current Devices" area and click on the icon (or select the "Show Device" option from the right-click menu) to make the dialog box appear as follows:



The "Show Device" option is particularly useful after the Net-Autoset procedure or whenever it is necessary to know which address is assigned to a specific slave scanner. Indeed, it activates the following signals which physically indicate the scanner corresponding to the one selected, in particular:

- in Network Wizard the icon corresponding to the selected slave scanner starts blinking red;
- in the Physical Network all slave scanner lasers turn off except the one of the selected scanner which turns on.

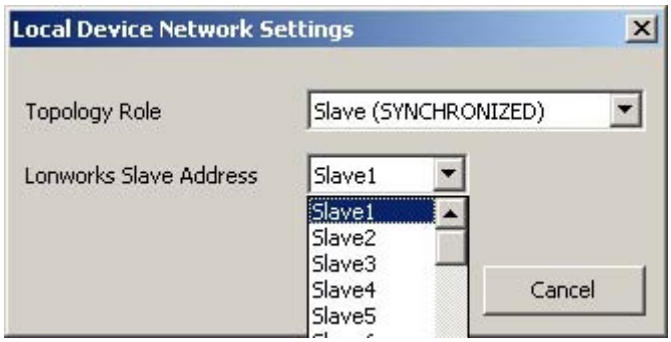
3. If desired, select the transferred/added slave scanner within the “Requested Devices” area and click on the icon to customize the scanner label and address.

4. Once your network has been customized, close the network wizard. Before closure, the program will show a dialog box asking whether to send the new configuration to the Master. Choose the “Yes” option to start this procedure.

3.2.2 Alternative Slave Address Assignment

As alternatives to Network Setup through the Master, each Slave scanner can be assigned an address through the following methods:

- random address assignment from SC6000 to all slaves in the network by performing the CASP™ procedure as described in par. **2.6.2**;
- address setting through the Local Device Network Settings item in the Device Menu with the slave scanner connected to Genius™;



- manual address setting through slave scanner keyboard (see par. “Internal Net” in the relative Scanner Reference Manual for details);

3.3 GUIDE TO RAPID CONFIGURATION FOR DS8100 AND DX8200 SLAVE SCANNERS

1) Connect to each scanner Debug port and set a Lonworks Node address which must be different and consecutive (i.e. 1, 2, 3, 4, etc.).

2) Make all the necessary PackTrack parameter settings.

3) Run Genius™ from the configuration PC. The following window appears asking to select the configuration mode.

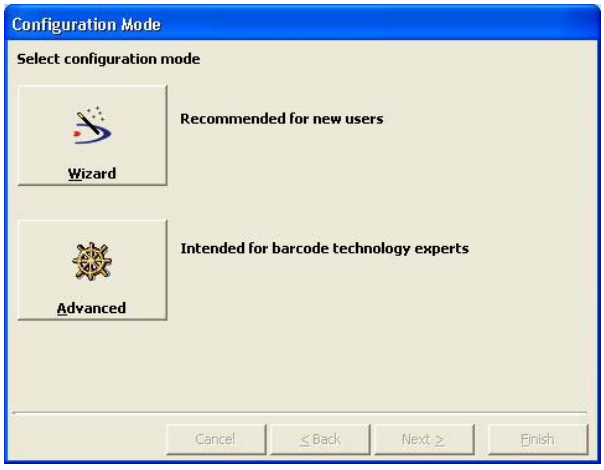


Figure 29 - Genius™ Wizard Opening Window

Select Advanced. The Wizard option is not currently available for SC6000.

4) From the Device Menu select Local Device Network Settings and configure your SC6000 as **Other**, as shown in the figure below:

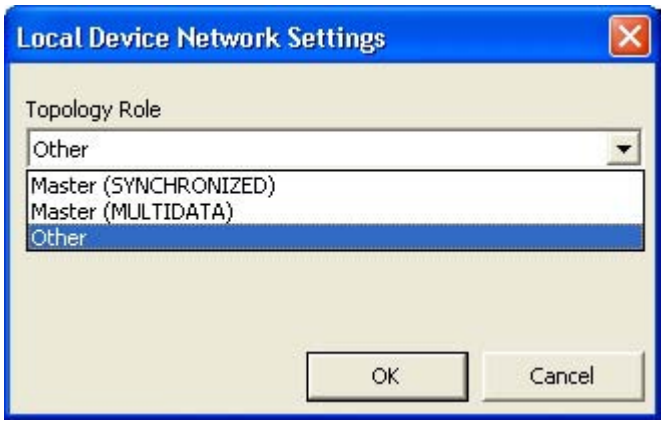


Figure 30 – Local Device Network Settings

5) From the Reading System Layout folder and configure the following parameters:

Device Assignment = Controller Lon Old8K

Number of Slaves = according to your application

Check the Modify Lon Slave Configuration

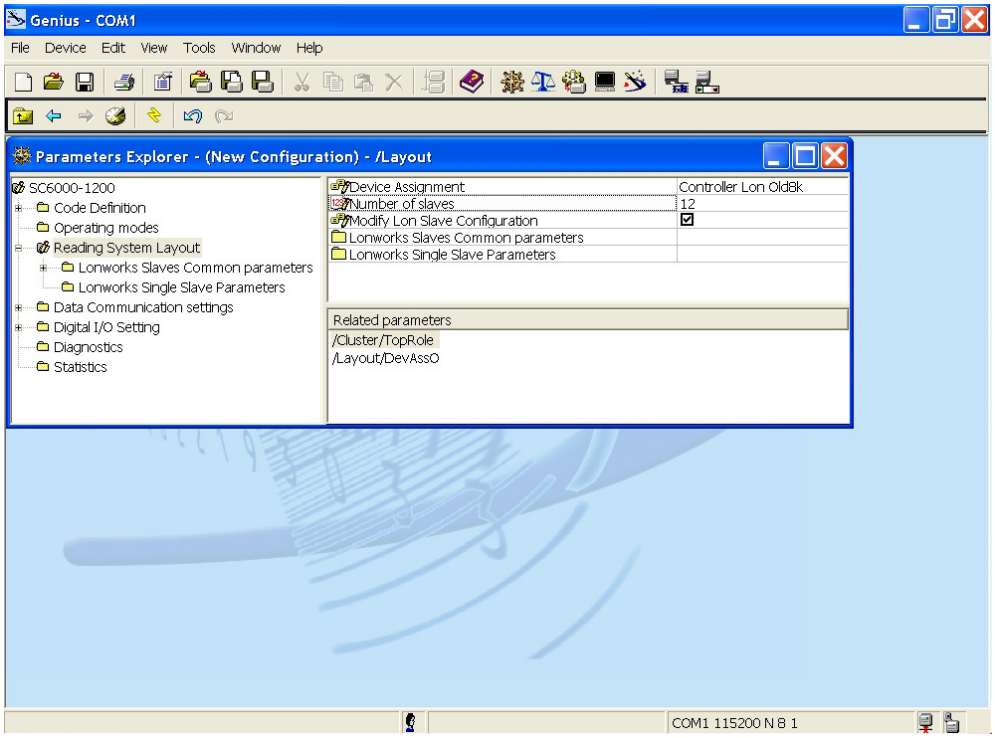


Figure 31 – SC6000 Device Assignment Configuration

6) Configure the Common Slave Scanner parameters according to your application using the Lonworks Slave Common Parameters branch in the Reading System Layout folder.

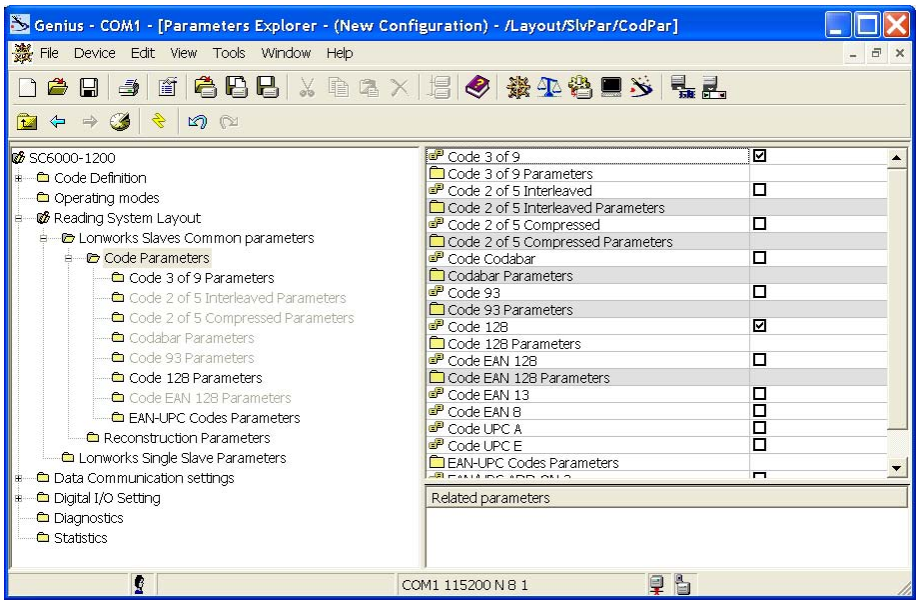
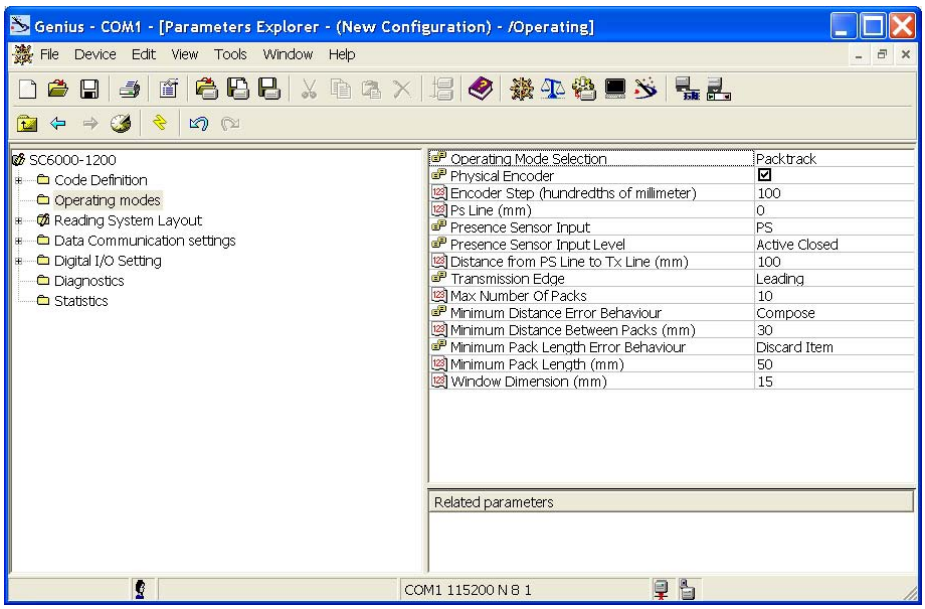


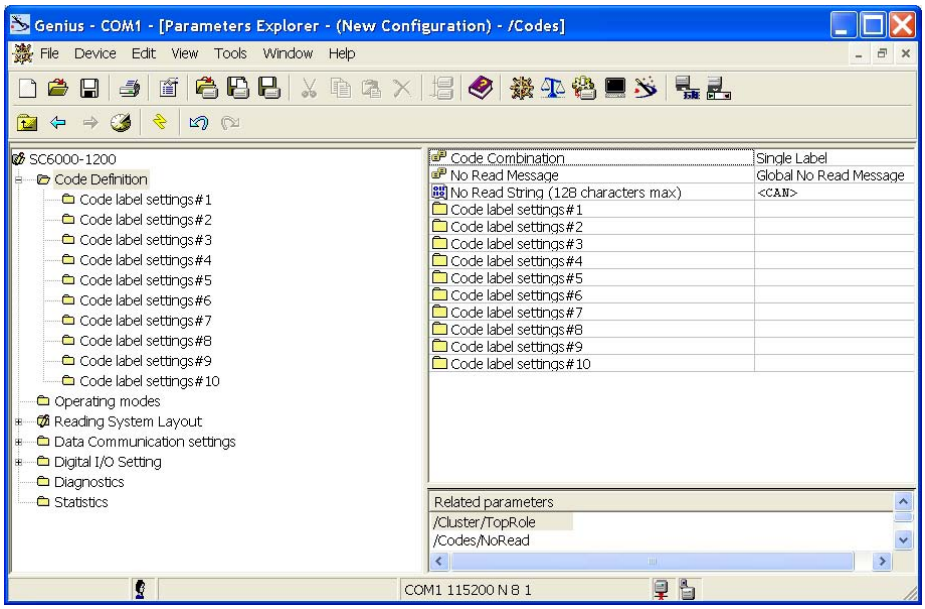
Figure 32 – Common Slave Scanner Code Selection Configuration

7) Configure the SC6000 parameters according to your application using the various configuration folders. The main steps are:

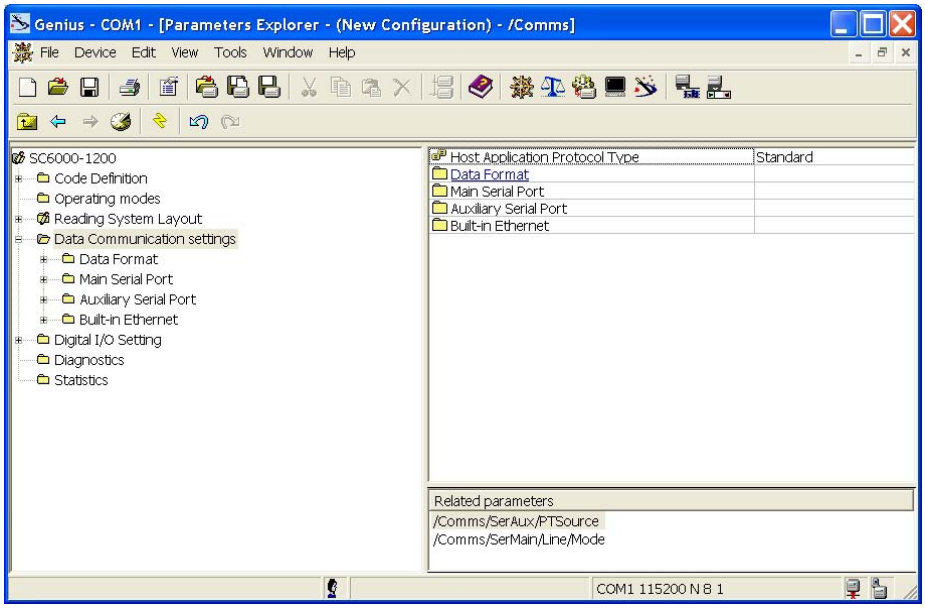
- Configure the PackTrack parameters in the Operating Modes folder


Genius - COM1 - [Parameters Explorer - (New Configuration) - /Operating]
File Device Edit View Tools Window Help
SC6000-1200
Code Definition
Operating modes
Reading System Layout
Data Communication settings
Digital I/O Setting
Diagnostics
Statistics
Operating Mode Selection Packtrack
Physical Encoder
Encoder Step (hundredths of millimeter) 100
Ps Line (mm) 0
Presence Sensor Input PS
Presence Sensor Input Level Active Closed
Distance from PS Line to Tx Line (mm) 100
Transmission Edge Leading
Max Number Of Packs 10
Minimum Distance Error Behaviour Compose
Minimum Distance Between Packs (mm) 30
Minimum Pack Length Error Behaviour Discard Item
Minimum Pack Length (mm) 50
Window Dimension (mm) 15
Related parameters
COM1 115200 N 8 1

- Selecting the codes to be read in the Code Definition folder (**they must be the same as those set for the slave scanners**)



- Set-up the communication and data formatting parameters in the Data Communications settings folder



8) Send the configuration to the Slave Scanners from the Send command in the Device Menu.

3.4 PARAMETER DEFAULT VALUES

The following table contains the list of the factory default settings for the SC6000 Controller. Genius™ also allows checking the parameter default values by selecting the "Compare parameters" option available in the Tools menu and comparing the current SC6000 configuration to the default one.

Parameter	Default Setting
Code Definition	
Code Combination	Single Label
No Read Message	Global No Read Message
No Read String (128 characters max)	<CAN>
Code Label Settings#1	
Enable	Enabled (checked)
Code Symbology	Interleaved 2 of 5
Label Length	8
Min Code Position	0
Max Code Position	255
CheckDigit	Disabled (unchecked)
Pattern Match String (200 char. max)	NULL
Code Label Settings#2	
Enable	Enabled (checked)
Code Symbology	Code39
Label Length	Variable
Minimum Label Length	1
Maximum Label Length	60
Min Code Position	0
Max Code Position	255
CheckDigit	Disabled (unchecked)
Pattern Match String (200 char. max.)	NULL
Code Label Settings#3	
Enable	Disabled (unchecked)
Code Label Settings#4	
Enable	Disabled (unchecked)
Code Label Settings#5	
Enable	Disabled (unchecked)
Code Label Settings#6	
Enable	Disabled (unchecked)
Code Label Settings#7	
Enable	Disabled (unchecked)
Code Label Settings#8	
Enable	Disabled (unchecked)
Code Label Settings#9	
Enable	Disabled (unchecked)
Code Label Settings#10	
Enable	Disabled (unchecked)

Parameter	Default Setting
Operating Modes	
Operating Mode Selection	Packtrack
Physical Encoder	Enabled
Encoder Step (hundredths of millimeter)	100
PS Line (mm)	0
Presence Sensor Input	PS
Presence Sensor Input Level	Active Closet
Distance from PS Line to Tx Line (mm)	100
Transmission Edge	Leading
Max Number of Packs	10
Minimum Distance Error Behavior	Compose
Minimum Distance Between Packs (mm)	30
Minimum Pack Length Error Behavior	Discard Item
Minimum Pack Length (mm)	50
Window Dimension (mm)	15
Reading System Layout	
Device Assignment	Master (Synchronized)
Data Communication Settings	
Host Application Protocol Type	Standard
Data Format	
Header TX Start	With Data
Termination After No Read Message	Enabled
Message TX Trigger Selection	On Decoding
Parameters	
Header String	<STX>
Code Position	Disabled
Code Direcion Identifier Enable	Disabled
Code Identifier	Disabled
Termination String	<CR><LF>
Data Packet Separators	<CR><LF>
Code Field Length Setting	Variable Length
Main Serial Port	
Data TX	Enabled (checked)
Parameters	
Main Port Communication Mode	Standard
Main Port Electrical Interface	RS232
Handshake	None
Baud Rate	9600
Parity	None
Data Bits	8
Stop Bits	1

Parameter	**Default Setting**
Auxiliary Serial Port	
Data TX	Enabled (checked)
Pass Through	Disabled (checked)
Parameters	
Baud Rate	115200
Parity	None
Data Bits	8
Stop Bits	1
Ethernet Port	
Status	Enabled (checked)
Eth_speed	Auto
DHCP	Disabled
IP_address	172.16.11.221
IP_netmask	255.255.0.0
IP_gateway	172.16.0.254
IP_dns1	172.16.0.21
IP_dns2	0.0.0.0
Digital I/O Settings	
Digital Input Lines Settings	
Debouncing for Input 1, 2 and 3	5 ms
Debouncing for Encoder	500 µs
Debouncing for PS and PSAUX	5 ms
PS Active Level Overridden by Op. Mode	Active Closed
Encoder Active Level Overridden by Op. Mode	Active Closed
PSAUX Active Level Overridden by Op. Mode	Active Closed
Input 1 Active Level Overridden by Op. Mode	Active Closed
Input 2 Active Level Overridden by Op. Mode	Active Closed
Input 3 Active Level Overridden by Op. Mode	Active Closed
Digital Output Lines Setting	
Output 1	
Line State	Normally Open
Activation Event	Complete Read
Alternative Activation Event	Multiple Read
Deactivation Event	Timeout
Alternative Deactivation Event	None
Deactivation Timeout (ms)	50
Output 2	
Line State	Normally Open
Activation Event	No Read
Alternative Activation Event	Partial Read
Deactivation Event	Timeout
Alternative Deactivation Event	None
Deactivation Timeout (ms)	50

Parameter	Default Setting
Output 3	
Line State	Normally Open
Activation Event	None
Alternative Activation Event	None
Deactivation Event	None
Alternative Deactivation Event	None
Output 4	
Line State	Normally Open
Activation Event	None
Alternative Activation Event	None
Deactivation Event	None
Alternative Deactivation Event	None
Output 5	
Line State	Normally Open
Activation Event	None
Alternative Activation Event	None
Deactivation Event	None
Alternative Deactivation Event	None
Output 6	
Line State	Normally Open
Activation Event	None
Alternative Activation Event	None
Deactivation Event	None
Alternative Deactivation Event	None
Diagnostics	Disabled (unchecked)
Statistics	Disabled (unchecked)

4 MAINTENANCE

4.1 DATALOGIC AUTOMATIC REPLACEMENT PROCEDURE (DARP™)

Once the system configuration has been completed, launch the DARP™ backup by one of the following methods:

Using Genius:

Click on the DARP™ backup icon in the Device Network area. You will be prompted to select the desired backup option (complete, all scanners, controller, or each single scanner).

Using the SC6000 keypad:

1. Press the <Ent> and <Menu> keys simultaneously to enter the Menu;
2. Use the <arrow> keys to move within the menu items;
3. In the <System> menu choose <Backup> and select the desired backup option (complete, all scanners, controller, or each single scanner).

The SC6000 Controller will store the complete system configuration on the Compact Flash card.

If a slave scanner has to be replaced, the corresponding configuration (node address, code configuration, PackTrack™ configuration, etc.) is automatically downloaded by the SC6000 into the new scanner at the next system startup.

NOTE

Systems with DS8100 or DX8200 slave scanners must have been installed according to the procedure in par. 3.3.

In case of SC6000 failure, the complete system configuration can be recovered from the damaged SC6000 Compact Flash: by simply installing the old Compact Flash in the new SC6000, the system configuration is automatically restored and the reading station is ready to start working again.

CAUTION

Before removing the Compact Flash card, switch the SC6000 Controller off.

In case of SC6000 failure proceed as follows:

Figure 33 - Removing the Compact Flash

1. Disconnect the device
2. Remove the rubber cover of the Compact Flash slot using a screwdriver
3. Remove the Compact Flash
4. Connect a new SC6000 to the system
5. Insert the Compact Flash card

CAUTION

Make sure not to insert the Compact Flash card upside down. Carefully insert it in the guides, so that it will not fall inside the device. Gently push it into the slot.

6. Start up the system

The system configuration is automatically restored and the reading station is ready to start working again.

5 TROUBLESHOOTING

NOTE

*Before contacting your local Datalogic office or Datalogic Partner or ARC, it is suggested to save the device configuration to a *.ddc file by means of the Genius™ software configuration program and check the exact device model and serial number.*

TROUBLESHOOTING GUIDE	
Problem	**Suggestion**
Power On: the “Power On” LED is not lit.	• Is power connected? • If using a power adapter, is it connected to PWO 25-pin cable?
On Line Mode 1: the "PS” LED is not lit (when external trigger activates).	• Check carefully if you are referring to the 25-pin connector of the PWO. • Is sensor connected to PWO PS input? • Is power supplied to photo sensor?
On Line Mode 1: the "PS” LED is correctly lit but nothing happens (no reading results).	• Is the software configuration consistent with the application condition (operating mode, etc.)? In the Genius™ software configuration program select the OPERATING MODES folder and check for related parameters.
Serial On Line Mode: the reader is not triggered (no reading results).	• In the Genius™ program select the OPERATING MODE folder and check if serial on line is enabled as “On Line options” parameter value. • Are the Start-Stop strings correctly assigned? • Is the serial trigger source correctly connected and configured)?
On Line Mode and Serial On Line Mode: the reader does not respond correctly to the expected external signal end.	• In the Genius™ software configuration program select the OPERATING MODES folder and check the “Reading Phase Timeout” parameterization.
Communication (Main / Aux): the device is not transmitting anything to the host.	• Is serial Main / Aux cable connected? • Is wiring correct? • If using the Main RS232 or RS485 interface, is the reference ground connected to GND_ISO? Be careful that it is not completely different from GND power ground. • Are serial host settings equivalent to serial device setting? • When using the Main interface, Tx Data and Rx Data LEDs must be lit during data transfer.

TROUBLESHOOTING GUIDE	
Problem	**Suggestion**
Communication (Ethernet): the Ethernet LED is not lit.	• Verify the HUB connection. • Verify Genius™ settings (see par. 3.4).
Communication: data do not appear on the terminal.	• In the Genius™ program enable the DATA COMMUNICATION SETTINGS/MAIN-AUXILIARY PORT\DATA TX parameter.
Communication: data transferred to the host are incorrect, corrupted or incomplete.	• In the Genius™ program select the DATA COMMUNICATION SETTINGS/DATA FORMAT folder and check for HEADER, TERMINATOR, SEPARATOR and FILL CHAR values. • Check the CODE FIELD LENGTH value. • Are the COM port parameters correctly assigned?
How do I obtain my units' serial numbers?	• The device serial number is printed on a label that is affixed on the bottom of SC6000 Controller. • The serial number is also displayed when connecting the device through the Genius™ program. • Serial numbers consist of 9 characters: one letter, 2 numbers, another letter followed by 5 numbers.

6 TECHNICAL FEATURES

ELECTRICAL FEATURES		
Supply voltage Power consumption	15 to 30 Vdc 6.5 W typical 9 W Max. (including startup current)	
Communication Interfaces	**Main (isolated)**	**Modem**
	RS232 RS485 full-duplex	RS232
		Auxiliary
		RS232
	Other	
	Lonworks Ethernet DeviceNet Profibus	1,25 Mb/s 10 or 100 Mb/s 125 or 250 Kb/s 12 Mb/s
Inputs (optocoupled NPN or PNP)	Encoder, PS, PS Aux, 3 polarity insensitive optocoupled inputs	
Outputs (optocoupled)	6 optocoupled outputs, 3 relay control outputs	
USER INTERFACE		
LCD Display	4 lines by 20 characters LCD	
Keypad	6 keys	
LED indicators	Power ON TX data RX data Ethernet PS	PS Aux TACH Networks Controller Scanners
SOFTWARE FEATURES		
Configuration modes	Genius™ utility program	
Parameter storage	Non-volatile extractable FLASH card	
ENVIRONMENTAL FEATURES		
Operating temperature Storage temperature Humidity	0° to +50 °C (+32° to +122 °F) -20° to +70 °C (-4° to +158 °F) 90% non condensing	
Vibration resistance	IEC 68-2-6 test FC 14 mm @ 2 to 10 Hz; 1.5 mm @ 13 to 55 Hz; 2G @ 70-200 Hz; 2 hours on each axis	
Shock resistance	IEC 68-2-27 test EA 30 G; 11 ms; 3 shocks on each axis	
Protection class	IP64*	
PHYSICAL FEATURES		
Mechanical dimensions	320 x 250 x 90 mm (12.6 x 9.84 x 3.54 in)	
Weight	3.3 kg. (7.26 lb)	

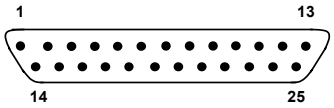
*with Harting RJ Industrial push pull Ethernet connector.

A ALTERNATIVE CONNECTIONS REFERENCE

POWER SUPPLY - I/O (POWER/NET CONNECTOR)

The PWO supplies 24 VDC.

25-pin D-Sub Female Connector Pinout		
Pin	**Name**	**Function**
1	REL1	Relay output control
2	REL3	Relay output control
3	GND	Ground
4	GND	Ground
5	ENCODER A	Encoder (Tach)
6	PS_AUX A	Presence sensor aux.
7	PS A	Presence sensor
8	SYS_ENC_I/O	System signal
9	RES	Reserved
10	RES	Reserved
11	SHIELD_OUT	Lonworks
12	LON_OUT B	Lonworks
13	LON_OUT A	Lonworks
14	REL2	Relay output control
15	RES	Reserved
16	VS	Supply voltage
17	ENCODER B	Encoder (Tach)
18	PS_AUX B	Presence sensor aux
19	PS B	Presence sensor
20	SYS_I/O	System signal
21	RES	Reserved
22	RES	Reserved
23	SHIELD_IN	Lonworks
24	LON_IN B	Lonworks
25	LON_IN A	Lonworks



25-pin Male D-sub Connector

Pin references with the denomination A and B are polarity insensitive signals.

Power

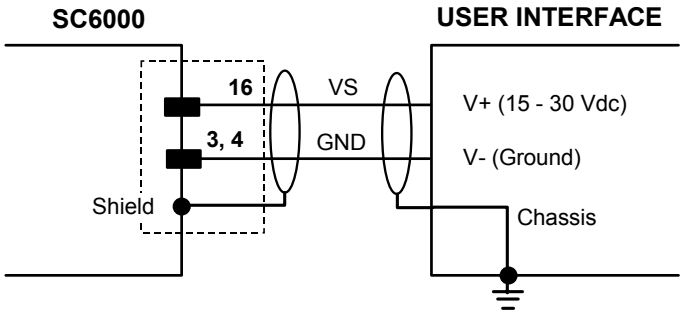


Figure 34 – Power Supply Connection

Lonworks

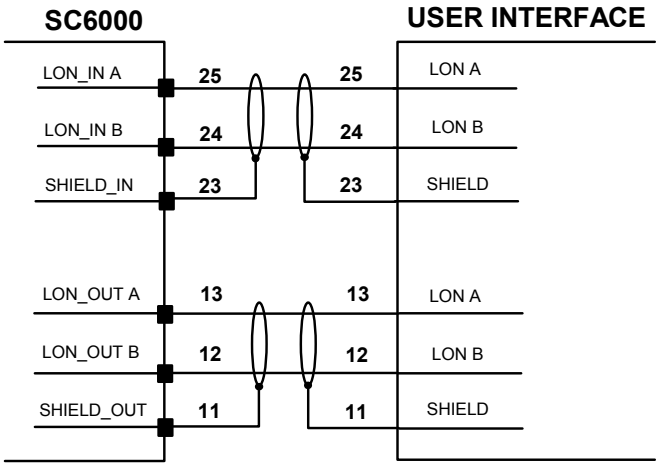


Figure 35 – SC6000 Lonworks Connection

PS/PS AUX/Encoder

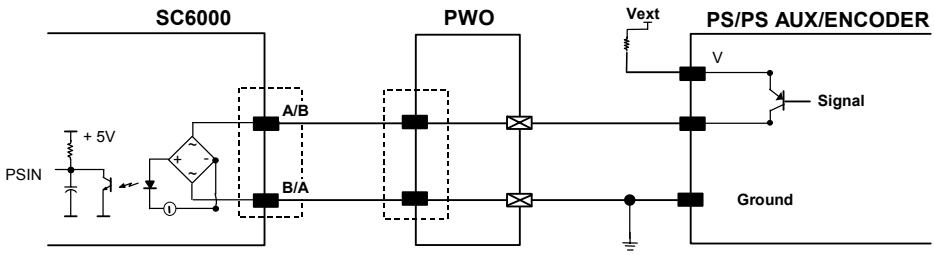


Figure 36 - PNP Command Input with Electrical Isolation

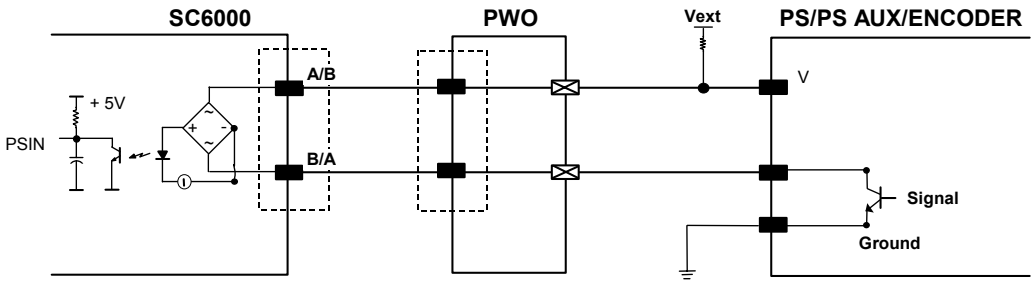
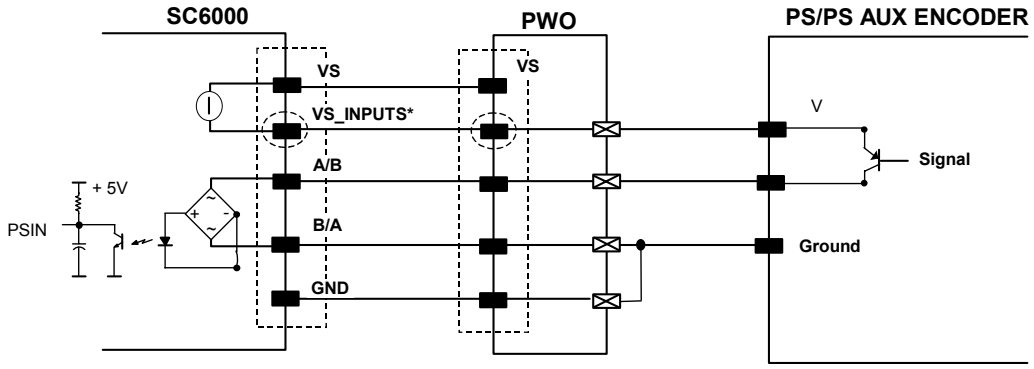
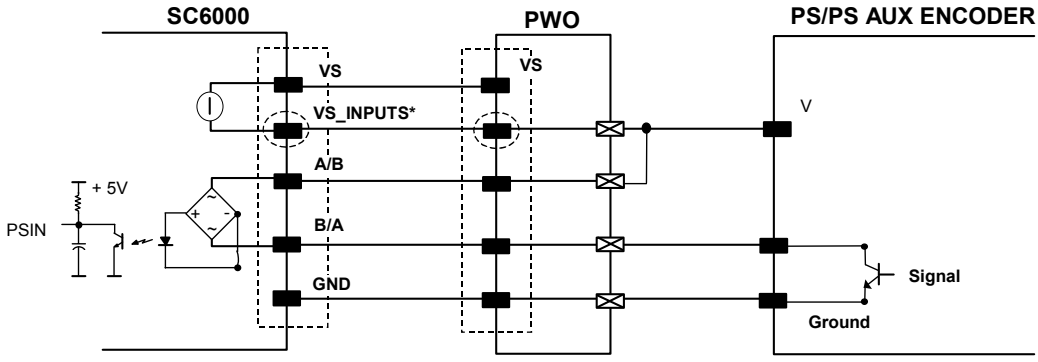


Figure 37 - NPN Command Input with Electrical Isolation



*VS_INPUTS is connected through the 25-pin Extended I/O connector. If this connector is not used, VS_INPUTS must be wired from one of the scanner terminals inside PWO, see the PWO Reference Manual for details.

Figure 38 - PNP Command Input Using System Power



*VS_INPUTS is connected through the 25-pin Extended I/O connector. If this connector is not used, VS_INPUTS must be wired from one of the scanner terminals inside PWO, see the PWO Reference Manual for details.

Figure 39 - NPN Command Input Using System Power

MAIN INTERFACE

The main serial interface is compatible with the following electrical standards:

RS232

RS485 full-duplex

RS485 half-duplex

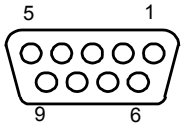
CAUTION

Do not connect GND and GND_ISO to different (external) ground references. GND and GND_ISO are internally connected through filtering circuitry which can be permanently damaged if subjected to voltage drops over 0.8 Vdc.

Details regarding the connections and use of the main interface selection are given in the next paragraphs.

9-pin D-sub Female Connector Pinout

Pin	RS232	RS485 Full Duplex
2	TX	TX485 +
3	RX	RX485 +
5	GND_ISO	GND_ISO
7	CTS	RX485 -
8	RTS	TX485 -



9-pin D-sub Female Connector

RS232 Interface

The main serial interface is used for communication with the Host computer through the PWO and allows both transmission of code data and controller configuration.

The following pins of the 9-pin connector are used for RS232 interface connection:

Pin	Name	Function
2	TX	Transmit
3	RX	Receive
5	GND_ISO	Main signal ground
7	CTS	Clear to send
8	RTS	Request to send

The RTS and CTS signals control data transmission and synchronize the connected devices.

If the RTS/CTS hardware protocol is enabled, the SC6000 activates the RTS output to indicate a message can be transmitted. The Host must activate the CTS input to enable the transmission.

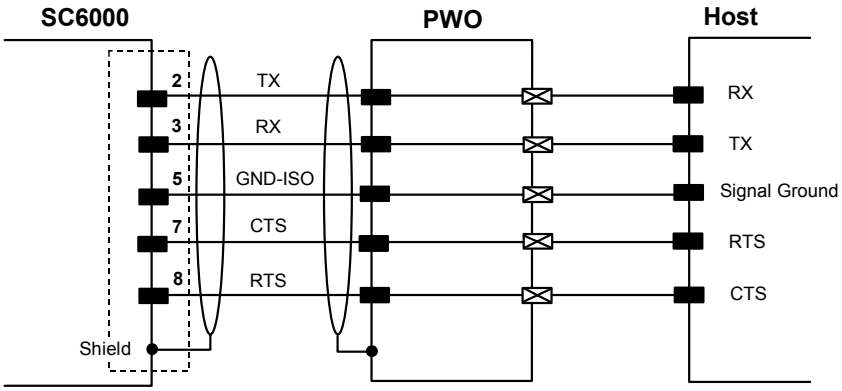


Figure 40 - RS232 Connections

RS485 Full-Duplex Interface

The RS485 full-duplex interface is used for non-polled communication protocols in point-to-point connections over longer distances than those acceptable for RS232 communications or in electrically noisy environments.

The following pins of the 9-pin connector are used for RS485 full-duplex interface connection:

Pin	Name	Function
2	TX485 +	RS485 output (+)
3	RX485 +	RS485 input (+)
5	GND-ISO	Main signal ground
7	RX485 -	RS485 input (-)
8	TX485 -	RS485 output (-)

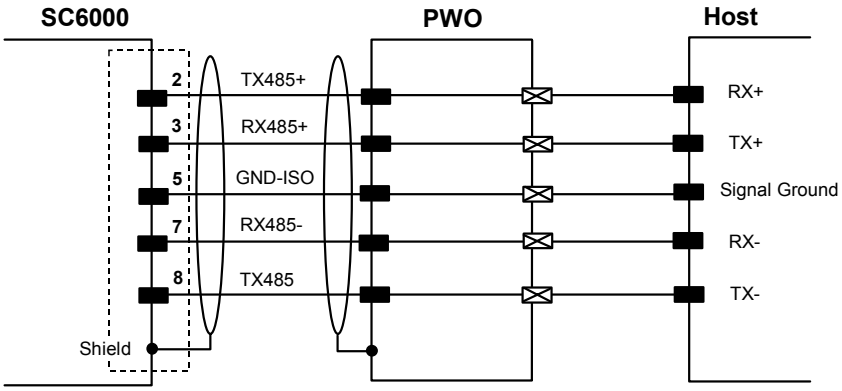
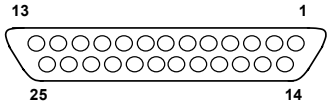


Figure 41 - RS485 Full-Duplex Interface Connections

EXTENDED I/O

25-pin D-Sub Male Connector Pinout			
Pin	**Name**	**Function**	
1	VS_OUTPUTS	Power for outputs	
2	IN1 A	Input signal 1 - polarity insensitive	
3	IN2 A	Input signal 2 - polarity insensitive	
4	IN3 A	Input signal 3 - polarity insensitive	
5	GND	Ground	
6	OUT1+	Configurable digital output 1 - positive pin	
7	OUT2+	Configurable digital output 2 - positive pin	
8	OUT3+	Configurable digital output 3 - positive pin	
9	VS_INPUTS	Power for inputs	
10	OUT4+	Configurable digital output 4 - positive pin	
11	OUT5+	Configurable digital output 5 - positive pin	
12	OUT6+	Configurable digital output 6 - positive pin	
13	GND	Ground	
14	GND	Ground	
15	IN1 B	Input signal 1 - polarity insensitive	
16	IN2 B	Input signal 2 - polarity insensitive	
17	IN3 B	Input signal 3 - polarity insensitive	
18	GND	Ground	
19	OUT1-	Configurable digital output 1 - negative pin	
20	OUT2-	Configurable digital output 2 - negative pin	
21	OUT3-	Configurable digital output 3 - negative pin	
22	GND	Ground	
23	OUT4-	Configurable digital output 4 - negative pin	
24	OUT5-	Configurable digital output 5 - negative pin	
25	OUT6-	Configurable digital output 6 - negative pin	



25-pin Female D-sub Connector

Inputs

All inputs are optocoupled.

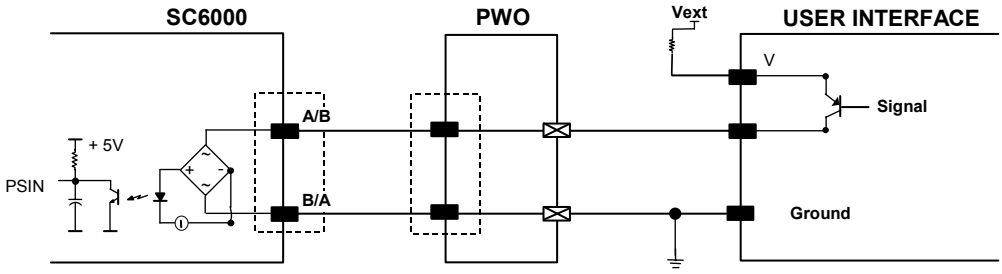


Figure 42 – PNP Command Input with Electrical Isolation

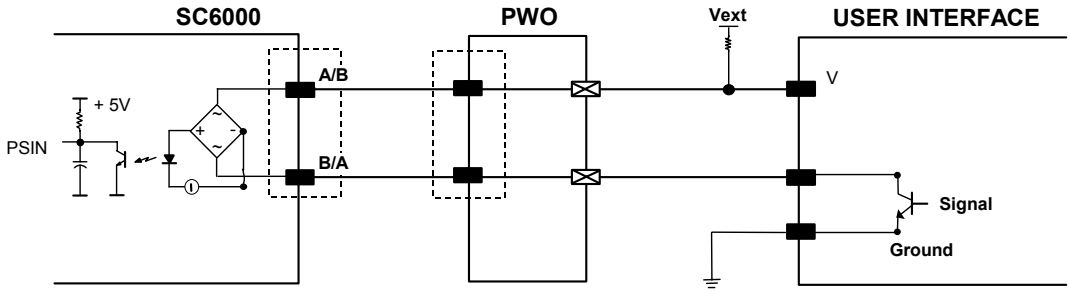


Figure 43 - NPN Command Input with Electrical Isolation

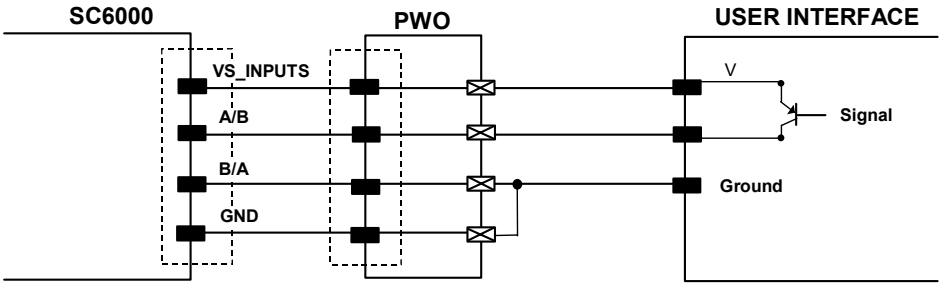


Figure 44 - PNP Command Input Using System Power

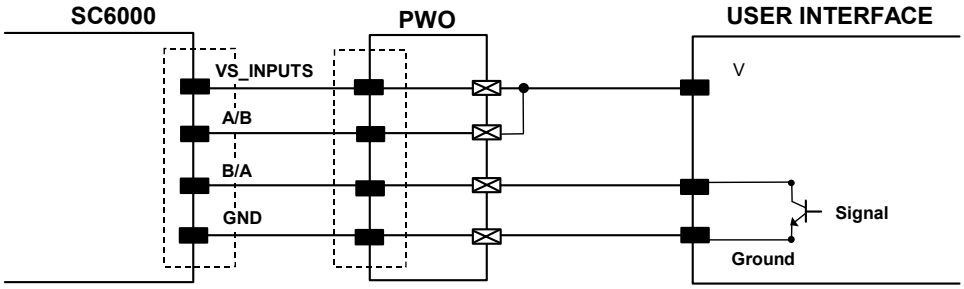


Figure 45 - NPN Command Input Using System Power

Isolation between the command logic and the scanner is maintained by powering the inputs with an external supply voltage (Vext). For convenience, the inputs can be powered using the VS_INPUTS signal on the SC6000 (pin 9). In this case, however, the device is no longer electrically isolated. The VS_INPUTS signal on the Extended I/O connector is short-circuit protected.

The electrical features of these inputs are:

Maximum voltage 30 V
Maximum current 10 mA

Outputs

Six general purpose outputs are available.

Pin	Name	Function
6	OUT 1+	Configurable digital output 1 – positive pin
19	OUT 1-	Configurable digital output 1 – negative pin
7	OUT 2+	Configurable digital output 2 – positive pin
20	OUT 2-	Configurable digital output 2 – negative pin
8	OUT 3+	Configurable digital output 3 – positive pin
21	OUT 3-	Configurable digital output 3 – negative pin
10	OUT 4+	Configurable digital output 4 – positive pin
23	OUT 4-	Configurable digital output 4 – negative pin
11	OUT 5+	Configurable digital output 5 – positive pin
24	OUT 5-	Configurable digital output 5 – negative pin
12	OUT 6+	Configurable digital output 6 – positive pin
25	OUT 6-	Configurable digital output 6 – negative pin

The function of all six outputs can be defined by the user.

Refer to Genius™ Help On-Line for further details.

By default, OUT1 is associated with COMPLETE READ event, which activates when the code has been read correctly. In case the reader has been programmed to read several codes within the same reading phase, the event activates when all codes have been read.

OUT2 is associated with NO READ event, which activates when no code has been read.

OUT3 - OUT6 are associated with NONE, which means that the output is always in line state.

Isolation between the command logic and the SC6000 is maintained by powering the outputs with an external supply voltage (Vext). For convenience, the outputs can be powered using the VS_OUTPUTS signal on the SC6000 (pin 1). In this case, however, the device is no longer electrically isolated. The VS_OUTPUTS on the Extended I/O connector is short-circuit protected.

The electrical features of these outputs are:

Collector-emitter voltage	30 V Max.
Collector current	130 mA Max.
Saturation voltage (VCE)	1 V at 10 mA Max.
Maximum power dissipation	90 mW at 50°C (Ambient temperature).

The limit requested by the maximum power dissipation is more important than that of the maximum collector current: if one of these outputs is continuously driven, the maximum current must not be more than 40 mA although 130 mA may be reached in pulse conditions.

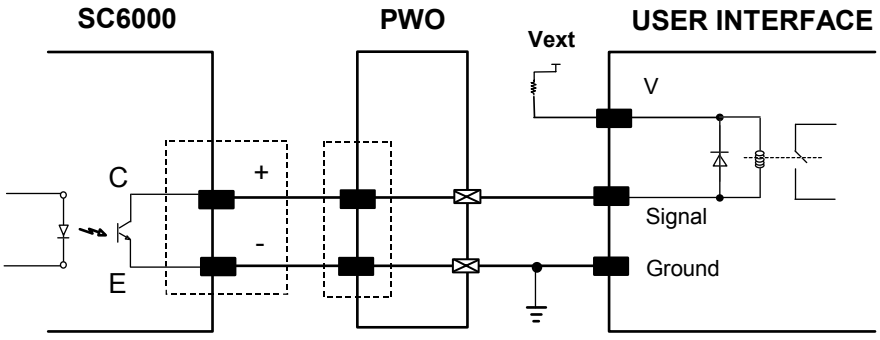


Figure 46 - Open Collector Output Connection with Electrical Isolation

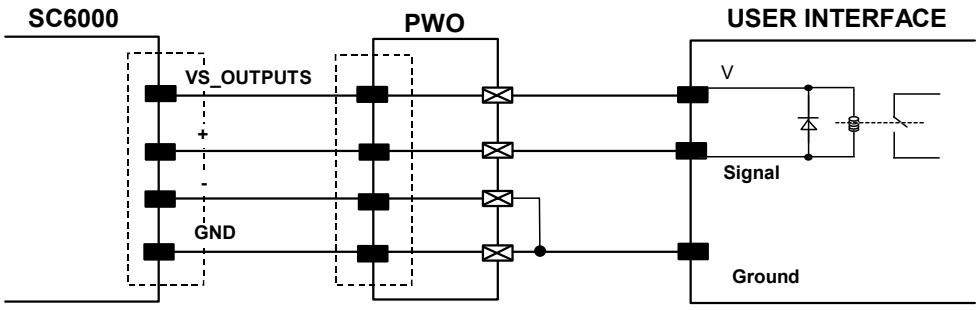
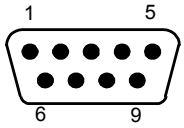


Figure 47 - Open Collector Output Connection Using System Power

MODEM

SC6000 offers a dedicated 9-pin port for a Modem connection. The modem connection allows a Host to remotely control the reading station.

9-pin D-sub Male Connector Pinout			
Pin	**Name**	**Function**	
1	CD	Carrier detect	 **9-pin D-sub Male Connector**
2	RX	Receive	
3	TX	Transmit	
4	DTR	Data terminal ready	
5	GND	Ground	
6	DSR	Data set ready	
7	RTS	Request to send	
8	CTS	Clear to send	
9	RI	Ring indicator	

GLOSSARY

Barcode
A pattern of variable-width bars and spaces which represents numeric or alphanumeric data in machine-readable form. The general format of a barcode symbol consists of a leading margin, start character, data or message character, check character (if any), stop character, and trailing margin. Within this framework, each recognizable symbology uses its own unique format.

Barcode Label
A label that carries a barcode and can be affixed to an article.

Baud Rate
A unit used to measure communications speed or data transfer rate.

EEPROM
Electrically Erasable Programmable Read-Only Memory. An on-board non-volatile memory chip.

Full Duplex
Simultaneous, two-way, independent transmission in both directions.

Host
A computer that serves other terminals in a network, providing services such as network control, database access, special programs, supervisory programs, or programming languages.

Interface
A shared boundary defined by common physical interconnection characteristics, signal characteristics and meanings of interchanged signals.

LED (Light Emitting Diode)
A low power electronic device that can serve as a visible or near infrared light source when voltage is applied continuously or in pulses. It is commonly used as an indicator light and uses less power than an incandescent light bulb but more than a Liquid Crystal Display (LCD). LEDs have extremely long lifetimes when properly operated.

Parameter
A value that you specify to a program. Typically parameters are set to configure a device to have particular operating characteristics.

Protocol
A formal set of conventions governing the formatting and relative timing of message exchange between two communicating systems.

RS232
Interface between data terminal equipment and data communication equipment employing serial binary data interchange.

RS485
Interface that specifies the electrical characteristics of generators and receivers for use in balanced digital multipoint systems such as on a Multidrop line.

Scanner
A device that examines a printed pattern (barcode) and either passes the uninterpreted data to a decoder or decodes the data and passes it onto the Host system.

Serial Port
An I/O port used to connect a scanner to your computer, identifiable by a 9-pin or 25-pin connector.

Signal
An impulse or fluctuating electrical quantity (i.e.: a voltage or current) the variations of which represent changes in information.

Symbol
A combination of characters including start/stop and checksum characters, as required, that form a complete scannable barcode.

Trigger Signal
A signal, typically provided by a photoelectric sensor or proximity switch, which informs the scanner of the presence of an object within its reading zone.

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SC6000-XXXX, Universal Controller

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und seine modelle
y todos sus modelos

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EN 55022 (Class A ITE), August 1994: **Amendment A1 (Class A ITE), October 2000:**	LIMITS AND METHODS OF MEASUREMENTS OF RADIO DISTURBANCE CHARACTERISTICS OF INFORMATION TECHNOLOGY EQUIPMENT
EN 61000-6-2, October 2001:	ELECTROMAGNETIC COMPATIBILITY (EMC) PART 6-2: GENERIC STANDARDS - IMMUNITY FOR INDUSTRIAL ENVIRONMENTS

Lippo di Calderara, 08.09.05

Ruggero Cacioppo
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